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CD Technology Standards • Help! • PowerBasic

NeXT's Next • Do You Need A Layout Program?

DTP with Ami Pro • WA On-line • Forth's Do_loop

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NEXT MONTH INCLUDES

Our feature on add-in cards will describe how to customise your PC – turn it into a full-featured answering and fax machine, chock-a-block with RAM and super-high-resolution graphics; or, add additional floppy drives, serial ports, an ESDI hard drive . . . just about any high-end feature can be added to a basic XT or AT and save you thousands of dollars on a new system. We'll also be looking at the latest generation of compact disk peripherals, including re-writable optical disks. Continuing our survey, we'll be testing the latest in dot matrix colour printers.

This month's cover: From left to right – Dataproducts' 1260i; Texas Instruments' PS17 Microlaser; Canon's BJ-330e bubble jet; Qume's CrystalPrint Publisher II; and Hewlett Packard's LaserJet III. Concept and photography by Phil Aynsley; design by Sally Anne Silveira; spelling by Nina Stevens.

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MARCH 1991

Ask **Compaq** which database their worldwide Human Resource system is based on.

Ask **Microsoft** which database can transparently access their SQL Server.

Ask **IBM** which application development tool they chose to develop an international marketing system in.

Ask **XLTECH** which **$300,000,000 Company** runs almost entirely on Advanced Revelation.

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JAKE KENNEDY

Who to call?

WE ARE CURRENTLY seeing a re-alignment of the dealer channels here in Australia. The biggest US distributors are now either here, or on the way. Primarily because of these moves, the traditional exclusive rights to import and distribute software are being diluted and the ramifications are flowing through the industry from top to bottom.

The first effect we noticed was by far the best for end-users: resellers are now trying hard to match US-dollar retail prices in Oz-dollars. And, because of the broader distribution channels, it's now easier for users to find a particular package – the days of being told the world's biggest sell-ing statistical analysis package, say, isn't available here because it's imported by a rival across the street, have pretty well ended.

But – the silver lining has a cloud around it. In the past, a sole distributor was able to afford fairly comprehensive technical support for its imports – and the good ones offered it complete with 24-hour, toll-free hot lines, bulletin boards and newsletters. For the top-selling pack-ages, that won't cause a problem for users because the big US software publishers – those with foresight, anyway – have set up their own offices here, independent of the distributors. On the support side, these generally function well as quality control checks.

But not all of us want or need the big, first-level packages. Many of us have rather specialised needs that are best ad-dressed by second-level (more specia-lised) packages. It's the users of these packages that are most going to feel the affect. These are the packages that few are going to be able to give the level of techni-cal support that users need.

March 1984

'Hobbyists tend to be the forerunners of the next trend. Take RCPMs: they are starting to spring up all over the place and are a definite direction that the market will develop in' – *Owen Hill, 'What Microbee Did', p44.*

Communications and computing have made the western world one where you must have English to survive – *Evan McHugh, ditto, p45.*

Fortunately we are seeing another epoch in support beginning. It was her-alded by Compaq's Technology Forum last year and the concept has been contin-ued by other players in the market. Essen-tially, these are good, solid backgrounders on a particular topic. There are usually two 'streams' to these forums, seminars, whatever they might be called on the day – the first gives an introductory overview of what users can hope to accomplish with a product family such as accounting, desk-top publishing or networking. The discus-sions at this level are an excellent way for potential users to determine whether or not this is a path worthwhile pursuing.

The second stream gives new and potential users enough information and training that they can do lesser trouble shooting or at least know enough to be able to describe a problem accurately and in the context of the overall system. This approach is also a reflection of how 'down market' the technical side of computing is coming: as the user base broadens, so does the level of base knowledge.

The hot topic amongst our readers at the moment is LANs – 'should I?' or 'shouldn't I' is the most recurring ques-tion, but the answer to that only raises myriad more questions. While we try to help readers as much as we can, we don't have the space to cover it in the depth it deserves for those who are considering tens of thousands of dollars. If you have been in doubt about networking or which type of network to opt for, I'd suggest con-tacting Com Tech who are running what appears to be a very comprehensive Open Systems Forum at Coffs Harbour from Friday, 14 March, to Sunday, 17 March. For more information give Merle Singer a call on (02) 317 3088 or fax (02) 693 2629. I'll keep you posted on other good back-grounders.

Thanks Tim!

TIM HARTNELL PASSED away in late January after a lengthy illness. His 'Your Amstrad' column has always been one of the most enthusiastically received of our user columns and his 'Hands on' series was a source of helpful advice and hints for thousands of readers over the past years. Tim's clear, no nonsense explana-tions of computer esoterica helped many new users over the first hurdles. Good-bye, Tim, and thank you. □

Future Features

IN ADDITION to our application stories, news and other informative pieces, each month we present features designed to keep you up to date –

April 1991
PC add-ons and *CD-ROM* software and hardware.

May 1991
Mass storage devices and *Security.*

June 1991
80386, '486 and *multi-processor system.*

Application stories – particularly those with the same theme as our features – are always welcome. Material must be re-ceived at least eight weeks prior to the month of intended publication. Please address editorial enquiries on our fea-tures to Jake Kennedy, (02) 693 9702, and advertising enquiries to Mark Wilde, (02) 693 6646.

HOWARD KARTEN

DTP hardware

SOME DOS AND Don'ts for your new Desktop publishing hardware. Those who're serious about DTP owe it to themselves to be aware of the options available today – although the word 'options' is something of a misnomer, since for those folks, knowing about scanners, and laser printers is hardly an option these days.

However, I've found out through hard, sad experience, that there are certain things which the manuals and the 'how-to' articles omit. Ignorance of these key practical matters spells certain disaster.

Laser printing

I FIRST STUMBLED across this phenomenon by accident. Ms. Computer Writer had purchased a laser printer to use with her Mac, and after idly watching her play with it for a while, I realised that I might be able to use it as well.

She had also purchased a cartridge containing some extra fonts, as well as about 4 or 5 of the software packages necessary to really get the most out of the machine. When I idly commented one evening 'You know, I bet I could do some of my work on that machine ...' her response was quick: 'No, because the Mac doesn't work like the IBM.' That came just as my head hit the pillow, so I thought no more of it.

Next morning, however, I realised: of course the laser printer could be attached to her IBM-compatible – and therefore I could use it too! It was just a simple question of (a) testing with and without the extra font cartridge, and (b) finding the proper escape codes to send to the printer for more advanced printing. Simple!

Looking through the manuals was a whole other story, however. For starters, they were written for naive end-users. They had all kinds of soothing cliches and irrelevant examples and excessive verbiage designed to ease a person into this stuff – and here I was looking for the heading 'escape codes.'

At length, however, – after looking through one of the obscure manuals that came with the printer – I found what I was looking for: a straightforward listing of escape codes and what they did.

The next time she went out of town, I was ready. A few test files later, I had exactly what I wanted and I was able to do whatever I wanted.

Compulsive tendencies

I BEGAN BY printing out a few files. I now think that that taste of success caused me to lose control. I started printing out all the documentation that I'd had sitting around on disks and always meant to print 'some day when I have time'.

Two reams of paper later, I began to realise just what I'd done. I'd printed out *all* the documentation files I'd never bothered to print out before – whether I really needed them or not. Now I had to find a way to manage it – collate it, bind it, index it, and so on ... It took me the better part of a day to punch it, put it into binders, and make space for it on the shelf above my machine.

At about the same time, my sister was weighing alternatives for the type face for her wedding invitations, and having heard Ms. CW's justifications for her new printer,

---

Creativity is wonderful, but don't get too creative.

I naturally couldn't resist trying to be a good brother and therefore opening my big mouth: 'Gee, that's just the kind of thing Ms. CW could do with her laser printer.' Equally naturally, not only was it not that simple, but Ms. CW was facing several deadlines, and in fact it took her 90 minutes to produce the same simple wedding invitation in four different fonts.

After several discussions between Ms. CW and I regarding using the printer, we finally arrived at the truth of the matter, and concluded that a LAN might be the answer to our problems. However after it became clear the cost of all the LAN hardware would be more than the cost of a used laser printer for me alone, we dropped the idea.

Scanners

ALTHOUGH WE HAVE no scanner here at The Word Factory, I have sent work out to be scanned. It started with an idea for a small business venture. One night, as I was going to sleep, I designed an elaborate information enterprise in my head. It would provide all the information on a certain subject, probably in some hypertext or relational database form. The key to the whole enterprise was that the information already existed in print, and all I had to do was scan it in and turn the resulting file to ASCII text.

I could scan the data in and easily create the necessary links between records and fields. Moreover, I would not be infringing on anyone's copyright because I would be adding value to the information and rearranging it drastically.

The next morning, I began putting it all down on paper. It really was an elegant, logical structure, and I was very impressed at what the scanner could do for me. Fortunately, I remembered to ask myself one tiny question: who are your customers for this venture? Three days' worth of weak answers showed me the wisdom of reconsidering.

I also heard a story, perhaps apocryphal, of another fellow who got overenthusiastic with a scanner. He was actually not a desktop publisher, but a classic hacker – one of those fellows who has a highly active curiosity. He had the opportunity to play with a scanner, and before he knew it, was testing his long-held belief that he could design more interesting currency than Uncle Sam. Using his scanner and laser printer (he got hold of a cartridge with green ink), he indulged his creativity. The Secret Service was not amused, and, so I hear, gave him a stern warning.

In other words, creativity is wonderful, but don't get *too* creative.

The contretemps between Ms. CW and I over her laser printer has an interesting end, by the way. She is a generous soul, and she generously offered to buy me a laser printer of my own. I declined, of course. I'm not sure I have the energy level or emotional stability to have my own. □

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BILL OLSON

The future with Unix

UNIX WAS A very risky thing to do in the '70s according to Anthony West from Sun Australia. Speaking at the National Convention Centre, West said that the reason people now think open systems are the future has got a lot to do with the power of standards.

'What customers hope for when they look for a standards based environment is the ability to procure hardware from a variety of different vendors with the assurance that their software investment can be easily moved from one machine to another.

'If you choose a system that supports a standard today, the chances are pretty good that when somebody invents the next whiz-bang hardware technology the first thing they will do is to make it compatible. Then they can gain access to all the application software that is already running on everybody elses machines. The best example of this is the widespread RISC technology. Now when somebody invents a new hardware type, the first operating system they will use is going to be Unix because it's cheap and easy to port. Sun grew out of a necessity to keep things cheap with off-the-shelf components and open architecture.'

West said that over the next five years the fastest growing segment of the computer industry will be that segment using Unix as its operating system. So all of a sudden a great number of companies are suddenly announcing 'yes we are open too and we use Unix'.

West pointed out that if Unix is growing then something else has got to be shrinking, and that segment is destined to be proprietary systems. 'So all those companies using proprietary technology are retrenching into Unix based technology just as fast as they know how. For example, in the last six months the top ten DOS PC products have gone to Unix with Lotus 1-2-3 and dBase being prime examples.'

Competition

WEST SAID THAT without a doubt Sun's major competitor is IBM. 'We spend a lot of our time thinking about IBM and about what IBM is going to do because they are the only company that can afford to take a five year loss on their workstation business as a mere investment strategy to become successful.

'So it's no wonder that IBM is going around with hundreds of millions of dollars buying ISV's nor is it any wonder when it comes to Universities giving the machines away. It's a strategy of course to get market share.'

Sun spends about $360 million annually on R & D. However, compared to the competition they have relatively few products to spend the money on. 'We have only one processor architecture, that's Sparc and we really only have one operating system – that's Unix. We only invest in one user interface, that's Openlook, and we have one network technology strategy, based on open network computing.'

'Our competitor's problem is that they have so many things to spend their R & D dollars on. They have DOS and OS/2, Unix product lines, proprietary systems, Intel products, perhaps Motorola products and their own proprietary instruction set machines. You then realise just how expensive it is to be in the computer business these days.'

One of the problems with computer upgrades these days is getting government agency approvals West said. 'It doesn't take very long to design hardware anymore – starting from scratch it takes about three months to design a processor board. But it takes about two to three years to get the box and the plastic through agency approvals. What you learn from this is that you can't change the box very often but you sure can rev the internal electronics.'

West said that as far as Sun was concerned, the Openlook versus Motif user interface was not an issue. 'Every Sparc system we ship goes out with Openlook, therefore we outship all other Motif vendors by ten to one every day. I don't really believe that it's an issue of politics or what is going to be the standard, because I believe standards are driven by volume and we have the volume.'

West predicted that within five years most software would be distributed on CD-ROM because 'you can get so much more on one. So we can put all of our operating system software, all of the binaries for all of our application software and all of our documentation in several different languages on one CD'.

'So you drop that thing into a CD-ROM slot on one of the machines on the network and everyone can use it. There's no installation, you just put the CD in the

The touch screen display allows the user to find out more information about certain points of the store.

PLEASE TOUCH THE SCREEN

NEC/MultiSync 5D

slot and go. When the next software upgrade comes out you get a new CD and stick it in the slot and you have upgraded the entire network.'

Also CDs can have sample software programs. 'One of the problems that faces the Unix industry is how to get your hands on application software that you might well be interested in,' West said. Technologies such as CD-ROM allow software to be distributed in demo versions. 'You just throw any number of applications on to the disk then you give them away. They try it and see the approach to software buying becoming increasingly important and popular.'

Touch me

TWO COMPANIES, Commodore and Trilogy Business Systems, recently demonstrated touch screen technologies in Canberra to Federal Government buyers.

Commodore, in conjunction with Info-Touch, a Queensland based company, showed two of their touch screens to interested users at the National Convention Centre. Buyers were most interested in the demonstration on a large 19-inch NEC MultiSync monitor with a glass touch

'If you choose a system that supports a standard today, the chances are pretty good that when somebody invents the next whiz-bang hardware technology the first thing they will do is to make it compatible.' – Dr Anthony West, SUN Australia, at the National Convention Centre.

screen overlay. The glass screen gives a much brighter picture than the plastic mylar overlays often used on smaller monitors.

The touch screen display included a store directory put together for Myers Melbourne. Screens showing a map of the store can be touched at any point the user wants to know more about. The graphic information also includes high quality scanned in colour photos of different departments within the store.

Martin Haynes, development manager for InfoTouch, said that touch screen users now want an instant response when they push the screen. 'Even a delay of only three seconds is too much and they will often walk away,' he said.

An added feature of the glass screen is variable touch pressure. For example, a pull down menu can be activated with one touch then a selection made from the menu by pushing slightly harder.

The software for the InfoTouch product is written in version 7.1 of Microsoft Professional Basic. Much of the screen information is called up from a hard disk so that the software only occupies about 120Kb in memory. The graphics were put together using two commercial products, Scanrix and Colorix. The curved glass touch screen which sits outside the monitor face is made in the US.

The system runs on a Commodore 386SX PC. There are plans to port the software to run on the Amiga 3000 Unix machine.

Microtouch

ANOTHER TOUCH screen product currently being demonstrated to Government departments is Microtouch from Trilogy Business Systems. The monitor is built into a pedestal so that the user looks down on the touch screen. The Trilogy demonstration shows a computerised job card system that could be used in public areas of CES offices.

The touch screen that Trilogy uses is called Microtouch Capacitive. Claimed advantages are that it has the long life necessary for public areas and that it is much cheaper to manufacture than other types of touch screens.

The software for the Trilogy system can also run up to nine screens from one '386 PC. Dean Dixon from Trilogy says that this is a big cost advantage over other systems. 'Most other touch screens need a PC linked to a file server for each touch screen and this is more expensive,' he said.

INDUSTRY UPDATES

Inmos develops PUMA

BRITISH TRANSPUTER specialist Inmos is predicting a 10-fold improvement in communications performance from the Parallel Message-Passing Architecture (PUMA) project.

PUMA is a European plan to develop fast, special purpose hardware for communications between processors regardless of their position in the computer. The 26-month project falls in three categories: component design and fabrication, development of techniques to fully utilise the components, and more speculative but important research into Parallel Random Access machines – a new model of parallel computation.

Participating in the project are Siemens of Germany, software developers Chorus Systemes and Syseca of France, as well as Bull and several European universities.

Work on components includes the design and fabrication of a new switch chip, the C104 as well as some elements on the new H1 transputer. PUMA Project Manager, Dr. Richard Evans of the Royal Signals and Radar Establishment in Britain, said that the H1/C104 combination represents a significant step toward alleviating the constraint of local communications by allowing transputer links to support many virtual channels and embedding low-latency message switching into the hardware of the switch chip. □

Training market targeted

SYDNEY-BASED software distribution house, Webster and Associates, is hoping to succeed in the international market with computer based training (CBT) packages for graphics software packages. Webster's first CBT package is for Corel-Draw, with packages for the rest of the 'top ten' graphics programs expected to be released by the end of 1991.

Tony Webster of Webster and Associates, said that 'if we get the top ten packages by next Christmas, we will have a $500,000 to $1 million export industry next year'. Webster went on to say 'we are on the threshold of expanding into the world market. This is why we need the extra half dozen CBTs. Computer based training is an area in which I think we are ahead of the rest of the world.'

The CorelDraw CBT packages have impressed Corel Systems to the extent that they included demonstration disks with version 1.2 of CorelDraw, and will promote the CBT product covering Version 2.0 of Corel-Draw when that version ships. Webster and Associates also produce CBTs for Ventura and Windows. One thousand copies of the Windows CBT were sold in the US in the past three months. □

HP regains PDP status

HEWLETT-PACKARD (HP) has regained its status under the Australian Government's Partnerships for Development Program (PDP) Agreement with new guidelines for its Australian operations. The company's position under PDP was threatened after it closed the Australian Software Office, a major part of its original PDP Agreement.

Under the new guidelines, HP has re-affirmed its commitment to the program. Broadly, the guidelines call for greater participation with local software developers to help develop new products, as well as to support overseas marketing efforts. Previously, HP's commitment centred almost exclusively on the ASO and the telecommunications market. When HP closed the ASO in September, its status under PDP was put under threat, and the government gave them six months to renegotiate the terms of the agreement.

The PDP was formulated by the government to address Australia's current account deficit, and to help local industries develop international competitiveness. Many multinationals' local operations have entered into agreements with the government, which stipulate what is to be done by the company, with specific exports set for the term of the agreement. □

Claris offers educational discounts

CLARIS' AUSTRALIAN subsidiary is offering its range of discounts for educational institutions to teachers and staff of those institutions. The move is to facilitate the wider usage of Claris' range of products used

Lotus in 1991

LOTUS IS PREPARING to increase its marketing aggressiveness in 1991 to boost penetration of the Australian market. This increased aggressiveness will include the release of several new products and the release of 1-2-3 on new platforms.

'The Australian market is very important to Lotus and we realise that to stay ahead of the competition we need to capitalise on our strengths – in terms of product quality and platform availability – and our competitors' weaknesses,' said Steve Crummey, Lotus' senior vice president, International Business Group. Although still holding first position in the marketplace for spreadsheets (much reduced in recent times) Lotus hopes to further increase its share in the market by focusing on 'markets not previously addressed by Lotus, such as small business and vertical areas whilst consolidating our stronghold in the corporate marketplace. Our aim is to increase our market share by deeper penetration into these new areas, at the expense of the competition,' Crummey said.

One of the main areas of products Lotus will be looking at in 1991 will be the Windows arena. Releases for Windows promised for 1991 include 1-2-3 for Windows, Freelance Graphics, and Notes, which will be tightly integrated 'beyond the scope currently seen with just Dynamic Data Interchange (DDE),' according to Crummey. Notes is Lotus' groupware product for Windows and OS/2 PM (Presentation Manager). In addition to these IBM compatible products, 1-2-3 for the Mac is due to be released in 1991. With Lotus' recent acquisition of Samna, developer of the Windows word processor Ami, the company will now also be aiming to incorporate Ami into the Lotus range of products.

in the education market.

The discount will mean that education staff can now save around 50 per cent on the recommended retail price of Claris software. According to Ron Wood, Claris' Australasian manager, the move was made to 'ensure that the package that educators use at home is the same as the one they use at work'. The scheme not only covers teachers, but administration and other staff.

To take advantage of the offer, staff at educational facilities just need to contact their local dealer and fill out a form which is signed by the principal of the institution to confirm their employment. Packages covered by the deal are Appleworks 3.0, Appleworks GS, Claris CAD 2.0, Filemaker Pro, MacWrite II, MacPaint 2.0, MacDraw II, MacProject 2.0, and SmartForm Designer.   □

system, which is the focus of the deal, was developed by SD, and will be 80 per cent manufactured in Australia.

According to Michael Faktor, chief executive of SD, the buyer is a Canadian subsidiary of a multinational company, but Faktor refused to name the company. SD is establishing a Toronto office to seek further business in the area. Originally, SD presented a proposal to the New York parent company, and they then made the decision to purchase the system for its Montreal subsidiary.

The system is already operating in several Australian sites, including Schwarzkopf, Blackmores and Arnotts. Although a third of SD's overseas business has been through the sale of Sequent Unix-based computers systems, it has been developing its own proprietary system recently, and the Canadian deal represents the success of these endeavours.   □

IT contributor in trade deficit

THE AUSTRALIAN information technology (IT) industry is a prime contributor to Australia's poor balance or trade performance, adding almost a quarter of the debt. Although hardware exports rose by 38 per cent last year, the deficit caused by hardware rose from $4070 million to $4190 million. By contrast, the total Australian trade deficit dropped from $20,000 million to $18,500 million this year.   □

Canadian contract for Sigma Data

LOCAL COMPUTER company Sigma Data (SD) has been awarded its largest overseas contract to date – a $500,000 deal with a Canadian company. The warehouse automation

CD-ROM disk for the Amiga

HYPERMEDIA CONCEPTS has released the 'Fred Fish' shareware and public domain library of programs for the Commodore Amiga on CD-ROM. The disk contains the equivalent of all 410 floppy disks in the Fish collection. Plans call for Hypermedia to update the CD-ROM disk with the latest Fred Fish floppy disks every four months.

Why a CD-ROM disk? According to Hypermedia, the CD-ROM version of the Fred Fish library is aimed at computer clubs as well as BBSs and other online systems, and the CD-ROM cuts down on pricing and storage problems.

The Fred Fish CD-ROM disk is designed for the upcoming

Pictured in front of YC's *office doing the Toyota leap is Gillian Rhodes of Mt Pleasant, NSW, winner of that 4Runner RV V6 seen behind her. Gillian renewed her subscription through a promotion that ran to November, 1990. A long-time reader, Gillian is 'over the moon' with the prize and can't wait to try it out in the bush.*

Amiga CD-TV system, which is scheduled for launch in the first quarter of 1992, and can be read by any CD-ROM drive conforming to International Standards Organisation (ISO) 9660 standard.

The disk contains the Fish collection in two versions – firstly, as with the floppy collection, organised by disk, and secondly, also by disk, but compressed using the Phil Katz PK-Zip system of file compression. PK-Zip programs for uncrunching the Zip-ped files are included on the CD-ROM disk.

Hypermedia says that there is one additional plus point for obtaining the Fish collection on CD-ROM disk – the data was assembled on a dedicated Amiga using virus-scanned disks. This, the company claims, means that the Fish CD-ROM disk should be virus free.

There are several developers who have announced, or will soon announce, the release of drivers that will allow users to connect virtually any SCSI CD-ROM drive on the market to the Amiga. Xetec of Salina, Kansas, makers of hard-disk systems, memory boards, and tape systems is one company that is offering CD-ROM for the Amiga. Over 400Mb of PD software includes the Fred Fish library, but at this time that is only up to volume 360. This CD-ROM also functions as a high-quality audio CD player and the price includes some audio software as well.   □

Apple and DOS users agree on GUI

THERE WAS A time when Macs were ridiculed by 'real' computer users as the 'wimpy' approach to computing. How could Mac users be 'real' computer users when they needed things in graphic form to understand them? I suppose this sounds like whining about treatment Mac users have been getting for years, and how Windows isn't so wonderful, but this isn't whining, it's an observation. And I'm not a die-hard Mac user (any more).

Obviously, coming from an Apple-user background, I was fairly reticent about using an IBM compatible, and I kicked and screamed and fought like many Mac users do. DOS users will have to admit, though, that Windows 2.x wasn't much of a product to sing and dance about. However, I persevered through necessity, and I became a fairly competent DOS and Windows user. When Windows 3.0 was released, I realised what I (and millions of other users) had been waiting for on the DOS platform – a capable and intuitive graphical user interface (GUI) that can compete with the Mac and look good.

And yes, Windows 3.0 does look good. It would have to be one of the best looking GUIs on the market today. Looks aren't everything, however, and luckily Windows also performs well (with the right machine, of course). I suppose I've been fortunate in that I've only used Windows on full '386 machines, but it seems to perform well. I now find myself in the middle of the 'Mac vs Windows' debate, with advantages and disadvantages on both platforms making it a draw at the moment. With each round, the features converge in their own way, while each environment keeps plenty of features looking different from the other to keep the arguments flying. At the moment, I would have to say that I see Windows in front, even with the release of the 'low-cost' Macs.

The main point of all this, however, is the perception of GUIs as a legitimate form of computing, especially at the personal computer level. When the Mac was released in 1984, and as time went by during the mid-late eighties, Mac users were accused of being wimpy, and not only because of the windows, icons, mouse, and pull-down menus (hence the term WIMP) used by the Mac O/S. Once Windows 3.0 was released, however, DOS users started singing the praises of GUIs.

I think Mac users might have respected their DOS counterparts more had they admitted in the first place that their main grudge against Mac was price. It can now be seen that they were just waiting for a worthwhile GUI to run on their cheaper IBM compatibles. Sure, the Mac is comparatively expensive (even the Classic), but it has always been fun to use.

By the way, the same goes for the Mac users – DOS isn't really as useless as Apple would have us believe, and with a bit of bi-directional respect (and dual platform programs like PageMaker), I think users will get a lot more out of their computers, and have a better idea of which platform is best suited to their needs. Windows isn't just another GUI – it has set the GUI world on fire, and the competition between the two environments should keep Apple and Microsoft on their collective toes for quite a few years yet.

– Sean MacNamara, Newsbytes.

Free QuarkXTensions catalog

QUARK, INC HAS announced the publication of its first QuarkXTensions catalog. QuarkXtensions allow independent developers to write software specifically designed to work with and enhance QuarkXPress.

The catalog lists vendors who provide Quark add-on products which allow users to add special features and capabilities to QuarkXPress, a publishing program for the Macintosh which integrates graphics, word processing, typesetting and page layout. Typical applications include links to databases, pagination systems, wire service integration, indexing and tabulation programs, special colour separation tools, and drivers for scanners. By using QuarkXPress as the core of a publishing system, a user can pick and choose among XTensions and create tailored solutions to complex publishing problems.

Each entry in the catalog describes the product, gives the list price and has a subject index, as well as information on how to become a QuarkXTension developer.

Quark also distributes QuarkFreebies 3.0, a 3.5-inch disk containing two free software extensions that offer additional features and groupware capability for QuarkXpress 3.0. FeaturesPlus and NetworkConnection are available free of charge to present QuarkXPress users who are covered by a Quark service plan. FeaturesPlus adds eight new features to QuarkXpress 3.0, including the ability to create fractions automatically, format prices automatically, modify the way in which QuarkXpress creates fractions and prices, move a chosen document to the front, displaying documents in alphabetical or front-to-back order, customise a number of program defaults such as the width of the pasteboard and the position of registration marks, convert an entered value in one measurement system to another, such as inches to points, remove manual kerning in a selected range of text and move pages in any direction.

NetworkConnection permits the exchange of files and messages among QuarkXpress users on a network. Users can send both text and pictures across a network to an open QuarkXpress document. They can also send messages independently of text or picture files. □

Hypercard for Apple IIGS

APPLE HAS UNVEILED a version of its Macintosh Hypercard application for the Apple IIGS at the Applefest Conference and Exposition at the Long Beach Convention Centre, in California. HyperCard IIGS is said to allow Apple IIGS users to create their own custom software and personalise the way they store, explore and present information.

Like the original HyperCard for the Macintosh personal computer, HyperCard IIGS functions much like a set of index cards. Users store information in documents called stacks, which are made up of individual units called cards. Cards can contain text, graphics, scanned images, and even sound. Buttons on the cards can be used to link cards and stacks, and much more.

HyperCard IIGS supports multiple media including text, graphics, video, sound and animation. It also takes full ad-

PC91 opens on Tuesday, March 5, at Darling Harbour, Sydney, with over 180 exhibitors from seven countries, which is fewer than previous years, but a good showing considering the depressed market. The products to be released at the exhibition include new notebooks, laptops and desktops, new monitors and printers, photocopiers and faxes, cellular phones and a wrist watch which integrates the features of a digital watch with a digital pager. Amstrad is providing the door prize of a Bizpack, valued at $3000, and Apricot is offering $5000 cash to anyone who can crack the security system on its networking system.

vantage of the 16-colour graphics capabilities of the Apple IIGS. The program comes with a large collection of ready-to-use stacks plus templates and card designs.

Apple says that HyperCard IIGS has the full functionality of Macintosh HyperCard version 1.2.5 and will allow IIGS owners to access the many stacks that already exist for the Macintosh once developers convert them for the Apple IIGS. □

Professional information services evaluated

THE TOTAL VALUE of professional information services in the European Community amounted to US$2947 million in 1988, a recent survey by the European Information Industry Association said.

Videotex, mainly through the immensely popular Minitel system in France, produced 15 per cent of the total revenue. An estimated 18,000 staff are directly involved with database dissemination. This and other statistical data was recorded by the EIIA, in a coordinated effort that brought nine national industry organisations in seven member states together.

The survey dealt with host organisations which had a physical presence in at least one EC member state. Some 349 organisations were identified, half of which were consumed inside the EC (56.5 per cent with a value of 1.4 million ECU).

The financial sector predominates in the EC online market with 56.5 per cent of turnover devoted to real time information and 43.3 per cent to retrospective information services. □

Borland wins award

BORLAND'S TURBO C++ Professional earned first place in US-based *PC Magazine's* seventh annual Technical Excellence Awards competition. This is the third consecutive year that Borland has won a Technical Excellence Award.

Turbo C++ Professional allows programmers to enter the object-oriented technology field by letting them mix traditional and object-oriented techniques, allowing employers to retain their investments in existing program code and programmer training.

Turbo C++ Professional supports AT&T's C++ 2.0 standards, and includes both a C++ compiler and a 100 per cent ANSI C compatible compiler. According to Eugene Wang, vice president and general manager of Borland's lan-guage business unit, 'Programmers are discovering the power of object-oriented programming. C++ is emerging as the programming language of choice in the '90s for systems and applications development. This award confirms that Turbo C++ Professional with its object-oriented technology is the ideal tool for corporations and independent developers to build more complex software in less time.'

A *PC Magazine* spokesperson said: 'Most users don't think about the work that goes into developing the software applications they use. Developers know better than anyone the tremendous effort required to bring a final product to market. No product introduced this year is better equipped than Turbo C++ Professional to make this happen.'

Borland's Turbo C++ was also a finalist in our Software Product of the Year Awards for 1991. □

Open standard for interactive multimedia

PHILIPS INFORMATION Systems is leading a European consortium that aims to develop an open standard for interactive multimedia applications based on existing and emerging optical storage technologies.

OSMOSE-1 will result in a high level Applications Programming Interface (API) and an authoring platform for CD-based interactive multimedia applications. The project is funded by the European Commission and forms part of the overall ESPRIT-program, a billion-dollar European Community program to develop high technology products within the 12-nation community.

The API will enable the development of multimedia applications which can be used on a variety of platforms such as operating systems, processors, CD-peripherals, a spokesman for the consortium said.

The preparatory action OSMOSE-1 is focusing on the requirement analysis for the API, W. Bulthuis of the Philips Information Systems Innovation Centre from Aachen, Germany, said. It addresses research on multimedia application standards, constraints, requirements and trends in systems platforms, end-user applications and authoring, and tailoring tools

Partners in the project are: Philips Information Systems, Olivetti, Bull, Maxwell Communications, Spain's Espasa Calpe, CAP SESA Telecom from France, Elektroson from The Netherlands and the University of Athens, Greece. □

A Typical Toshiba User Needs Power, Speed Portability, and Looks Like This

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TECH TIPS

If you have a PC problem that's been bugging you, put the details on paper and send them to us, and we'll try to help. On the other hand, if you have any technical advice or hints on using hardware or software that might interest others, drop us a line and we'll pass them on. The best Tech Tip published each month will earn the author a $100 voucher, redeemable at any Rod Irving Electronics or Software Express store, or by mail order from either company. Send your letters to Tech Tips, *Your Computer*, PO Box 199, Alexandria 2015 NSW, or fax them to (02) 693 9720.

Edited by
Mark Cheeseman

Floppy disk capacity

I recently purchased several boxes of high density 3.5-inch diskettes, and was surprised by the claimed capacity of the disks – 2Mb. When I format them on my PC, I only get the usual 1.44Mb capacity, which is what my DOS manual leads me to expect. So how can the manufacturer of these disks get away with claiming that they have a 2Mb capacity? Can other computers store more information on them than the PC, or are there utilities to store more data on a given diskette than DOS can handle?

G. Townsend

No, the manufacturer is not taking you for a ride! The capacity of the disk is indeed 2Mb, unformatted. However, the process of formatting the disk uses up some of it. The sectors need to be marked out on the tracks, and other space is taken up with Cyclic Redundancy Check (CRC) information, which ensures the integrity of the data on the disk (and is also used by some of the more insidious copy-protection schemes). The file allocation table and root directory also take up some of the available space.

Once all of this formatting information is taken into account, the capacity drops from the claimed 2Mb, to 1.44Mb. As far as the disk is concerned, it *is* storing 2Mb of data. The fact that some of the data is simply there so that the computer can find the other data is irrelevant as far as the disk itself is concerned. Equally irrelevant to the end-user is the 2Mb figure.

So unless you can store your information on an unformatted disk (and if you can, we would like to know how you do it), the unformatted figure is not a lot of use. One reason that manufacturers *do* display the unformatted capacity is that they have no real way of knowing how much space will be left on the disk given the variety of different disk formats available. For example, a PC and Atari STs can store around 720Kb on a double density disk, while a Mac manages to fit 800Kb on the same disk. There are also utilities around which cram a few extra per cent capacity on PC disks, by formatting them differently.

So while the disk manufacturer is not setting out to deliberately mislead us, there is no way that any computer is going to get 2Mb of data onto a 2Mb diskette.

Reading a bent disk

The other day, the editor of one of our sister publications brought me a 5.25-inch floppy disk and asked me if I could read it. This would not normally be a problem, except that it looked as if it had been rolled up and stuffed into a mailing tube. Although the outer jacket looked like a write-off, the disk itself didn't look too bad – there were a couple of tiny creases in it.

So how do you recover data from such a disk? For starters, you need to *want* to recover the data. That is not intended to sound facetious – you already have one dud disk, and the recovery process involves destroying another one. So the data you're trying to recover has to be worth at least as much as a floppy disk.

Take an unused disk, and carefully prise the jacket open along the top edge (the one furthest from the head access hole), and remove the disk from within the jacket. Cut the remaining flap off so that it doesn't scratch any disks as they are inserted.

Now turn your attention to the damaged disk, and remove it from its protective jacket in the same way. Bend it all the way back, so that it is out of the way when you come to remove the disk. When removing the disk from the jacket, try to avoid touching the active surface area with your fingers. This will just add to the problems which you already have.

Once the disk has been removed from the damaged jacket, slip it into the good jacket from the 'sacrificial' disk, taking care to ensure that it is inserted the right way up. Now, put this disk into a disk drive and try to read it. If it is readable, quickly copy the data to a hard disk or another floppy. If you get errors reading some sectors, it's time to start using any file recovery utilities you have at your disposal, such as the Norton Utilities, or the Mace programs.

The trick is to get as much data as possible off the disk as soon as you can. If the disk is creased, the magnetic particles will quickly wear away from these areas, rendering that data unreadable. Also, this dust will build up on the heads, so it is a good idea to clean the heads after any operation such as this.

Hidden Windows

Windows 3.0 has two text files which contain important information telling Windows about the system on which it is running, and the applications which run under it – system.ini and win.ini. Although these files are automatically created when Windows is installed, and updated when new software or drivers are installed, there is often a need to modify them manually, such as when you remove an application from your hard disk – how many applications have you seen with an 'uninstall' option, which cleans up after a package is removed from the disk? The system's autoexec.bat and config.sys files are two others which are often changed for various reasons.

The Windows Notepad is one way of doing this – double-click on Notepad, and then load the appropriate file into it for editing, or create an icon in a program group which fires up Notepad with the file

already open. However, the first of these can be rather tedious, and you may not want to clutter up program groups with an additional icon for each file.

Windows actually has a special utility for editing these files hidden away in the 'system' subdirectory, called sysedit.exe. Firing this up brings up the program with all four above-mentioned files in separate windows, ready for editing. Of course, any changes made will not take effect until Windows is restarted, or the system is re-booted, as appropriate. To make sysedit appear as an icon in Program Manager, start File Manager, and re-size or move it so that you can see the desired program group in Program Manager underneath it. Then locate the sysedit.exe file, and simply drag its icon over the appropriate program group, and it will appear in Program Manager.

By the way, remember the old MS-DOS Executive front-end from Windows 1.x and 2.x? Well it is still there with Windows 3.0 and still called msdos.exe. For those times when you want to do a bit of file manipulation, but find all those windows in File Manager a bit cumbersome, the old MS-DOS Executive can still be useful.

No graphics

I have a graphic display problem – in reverse! Is there any way to disable the graphic capabilities of IBM XT machines, most equipped with CGA cards, and one or two with Hercules-compatible cards. The students spend an awful lot of time playing games on these computers instead of (naturally) working on their assignments. What is worse, by borrowing and lending copies of games, the students continually infect the computers with viruses.

Most of the students' computer work consists of spreadsheet, word processing, and database use, with only a limited need for graphics. Without graphic capability, the computers would become unusable for games and, hopefully, less prone to virus infection. One or two could be kept for graphic work (and games when free). Can you suggest any way to disable the graphics?

G. Vatasan

That's an odd one all right! I'm not sure of any simple modification to CGA or Hercules cards which would disable the graphics modes, and a software solution may not be possible either, because of the way in which games tend to access system resources (such as the screen) directly, to maximise speed.

The only solution I can think of would be to network the PCs to a common file server, and equipping the network cards with auto-boot ROMs, so that they boot from the network, and not the floppy drives. By providing a user shell which restricts users to using those applications which you deem to be relevant to their studies, the playing of games would be prevented. You could still allow students to use the floppy drives to keep their assignments on, but not allow programs to be run from them.

If anybody out there *does* know of a simple way to disable the graphics modes on CGA and Hercules cards, drop us a line, and we'll pass the information on to Mr. Vatasan.

Windows startup

Is it possible to disable the startup screen in Windows 3.0? It takes a good few seconds, which I am sure can be put to better use than just displaying a pretty screen.

R. Bylart

Sure, it *is* possible to disable the Windows startup screen, by typing something on the command line, such as 'win :'. However, this will speed up Windows' startup minimally, if at all. Next time you start up Windows, watch the hard disk light – it doesn't stop flickering until the Program Manager window appears. Windows is using that time to load itself into memory, create temporary files and possibly a swap file. All this takes time, whether the screen is displaying anything or not.

Presumably the programmers at Microsoft thought users would like to see some feedback to indicate that Windows is actually starting up and hasn't just crashed. Personally I happen to like the opening screen, for that very reason (I probably crash my machine a lot more than most people) and I like the colour scheme. So get rid of the screen if you will, but you'll just end up staring at a blank screen instead of a startup message.

RAM disks and Windows

I recently upgraded from my aging genuine IBM AT to a 25MHz '386 clone with 4Mb of RAM, due to the increasing demands of modern software on processing power, especially Windows and its multitasking ability. However, I am not sure how to best utilise this amount of memory. Should I leave it to Windows to set up for me, or would I be better off using some of it for (say) a RAM disk or print

spooler? Also, I had a 2Mb EMS board in the AT, and I don't know whether I should leave it there or transfer it to the '386.

B. Collins

Many people in the past bought high-performance machines with lots of memory, without realising that DOS wasn't capable of using the extra memory unless specific steps were taken to do so, such as implementing a RAM disk or disk cache. Windows 3 has changed this situation somewhat, with its ability to sense the memory configuration of the target machine and configure itself to make what it thinks to be the best use of the memory.

For most applications, Windows can be safely trusted to make the best use of available memory in '286 and '386 machines. If memory permits, it will install its own disk cache (smartdrv.sys), which uses some of the available memory to store recently-stored disk tracks. The beauty of smartdrv is that it is designed to work with Windows, so that Windows can dynamically re-size the cache as it needs memory, or has memory available for use.

RAM drives are rarely the best way to manage memory in a system – usually a better alternative is to use a disk cache. With a RAM drive, you have to decide which files to put in the RAM drive, and often you end up having to put files in the RAM disk which aren't accessed very often, simply because they need to be in the same directory as other files which *are* frequently accessed. Also, any data files stored in the RAM disk need to be copied back to the hard disk before rebooting. If the machine happens to crash before you get a chance to do this, it's too bad.

A disk cache, such as smartdrv, on the other hand, has some level of 'intelligence', which allows it to determine what to put in memory, and what to forget about. Generally speaking, those parts of the disk which are accessed most often are those most likely to be found in the cache.

Be careful when comparing the speed of a machine with a RAM disk against a hard disk with a cache, as there are times when a RAM disk will appear faster, although this may not always be the case. For example, when launching an application from a RAM disk, it will almost always out-perform a cached hard disk. The simple reason for this is that launching an application typically means opening several files which haven't been used before, so they aren't in the cache. A RAM disk, which has the application files in it, will be able to make the files accessible to the operating system much faster than a cache, which

Software Express/Rod Irving Electronics
Tech tip of the month

I HAVE A Toshiba T1000SE notebook computer, which has just the one 3.5-inch floppy drive. Because the MS-DOS Backup and Restore utilities are not suitable for backing up diskettes on a single drive, I developed a small batch file which makes backing up simple, and also keeps a record of what was done and when it was done.

Backprod.bat takes advantage of the 328Kb RAM drive (drive D:) which the Toshiba maintains with its battery, even when switched off. This eliminates any problems that would arise with the batch file being placed on the drive which is being backed-up.

The batch file expects one parameter – the volume label on the diskette to be backed up. This is for documentation reasons, as the backup will proceed whether the volume label on the diskette matched the command-line parameter or not. By logging the backup to a log file (also on drive D:), I can always check which volume was last backed up, and when. It also serves to remind me when backups haven't been done for a while.

The batch file starts by displaying a banner, and then checking for a parameter. If the parameter is 'help', or no parameter is supplied, control is transferred to the 'helpinfo' label, where a help message is displayed. Otherwise, the parameter is appended to backprod.log, followed by the actual volume label on the diskette, and then the backup begins using the diskcopy utility. I chose diskcopy as it handles disk swaps in the one drive quite happily.

When the diskcopy program is finished, the success or failure of the backup is checked using the errorlevel test, and an appropriate message displayed on the screen, and also recorded in the log file. The time and date are also recorded in the log file for future reference.

I have found this batch file very useful in overcoming the only problem with my precious Toshiba.

Steve Clark

```
@echo off
echo      --------------------------------------------
echo              backup procedure for diskettes
echo      --------------------------------------------
; check for parameter
if '%1'=='' goto helpinfo
if '%1'=='help' goto helpinfo
if '%1'=='HELP' goto helpinfo
; perform backup and log to log file
echo      Backup of %1 diskette begins >> backprod.log
vol a:
vol a: >> backprod.log
diskcopy a: a:
; check for success or failure
if not errorlevel 0 goto error
echo      Backup of %1 completed successfully >> backprod.log
goto endjob
:helpinfo
echo      Enter BACKPROD volumename
echo      to run this backup.
echo      ...................................................
echo      note that it logs to BACKPROD.LOG
echo      ...................................................
goto endall
:endjob
echo      ******* End of BACKPROD job *******
now >> backprod.log
echo      ******* End of BACKPROD job ******* >> backprod.log
:endall
echo on
```

Notes: The 'now' command used in the batch file is a utility supplied with the Toshiba in its ROM version of DOS, which prints the current date and time on the screen. If you use this batch file on another type of laptop, you could get away with using the DOS time and date commands. If you create a file with just a carriage return in it, and re-direct this as input to the time and date commands, you won't have to hit the Enter key each time. The only disadvantage is that the 'Enter new date/time' messages will appear in the log file. Peter Norton's time mark (tm) utility would be a better solution.

first has to read the files in from disk.

However, when the program needs to access a single file (or a few files) several times in quick succession, the cache will rapidly approach the performance of a RAM disk, as more and more disk requests can be handled by the cache without reading the disk at all. The percentage of disk accesses which are handled entirely by the cache is called the cache 'hit rate'. The bigger the cache, the smaller the area of the disk which is accessed frequently, and the better the caching algorithm, the higher the hit rate.

So although you will never achieve a 100 per cent hit rate in a real-world application, the loss of performance compared with a RAM disk (which will always have a 100 per cent hit rate) has to be traded off against the extra time and effort needed to determine what should be in the RAM disk, and actually copying it there, and perhaps copying it back afterwards.

Also, because a disk cache caches disk sectors or tracks, only the most frequently-accessed parts of files need to be cached – you can't store part of a file in a

RAM disk, and leave the rest on the hard disk. Also, there is the security of knowing that anything written to the cache will eventually find its way onto the spinning metal of a real disk drive – not so with a RAM disk.

Don't be tempted to use a RAM disk as a swap disk either; the memory would be better used as system RAM by Windows or any other multitasker you are running. If the RAM used for the disk was directly available to the system, there would have been no need to swap to disk in the first place. If you have more than one hard disk in the system, put the swap file on the fastest one, since it is acting as a virtual RAM, and the faster the swap disk, the higher the overall performance of the system when things start to get busy.

So in summary, unless you have a specific need for a RAM disk, you are almost always better off allocating the memory which you would use for the RAM disk, to a disk cache instead.

As far as your EMS card in the AT is concerned, I'd be inclined to leave it where it is. You could conceivably put it in the '386, and use it as a RAM disk or disk cache, but if you really wanted extra memory in the '386, you would be better off investing in a proper 32-bit memory card to suit your motherboard – the memory accesses will be much faster, and you can emulate EMS if required on a '386 with something like QEMM (from Sourceware, (02) 427 7999), and Windows can also emulate EMS for applications running under it.

Also, if you use the board in the '386 with its EMS driver, there is a good chance that it won't work with Windows in Enhanced mode, which tends to be rather fussy about the company it keeps. All things considered, trying to get the EMS card going in the '386 is probably more trouble than it's worth, but don't let me stop you trying it out, if you're keen. If it was me, I would probably have a play with it, if only to satisfy my curiosity.

Static protection

With RAM chips costing but a fraction of what they did a year or so ago, I decided it was time to upgrade the memory in my AT from the supplied 1Mb, up to 4Mb. In my machine, this simply involves (according to the manual) setting a few DIP switches, and replacing the 36 RAM chips with bigger (1 megabyte) numbers. However, after buying the chips, I recalled reading an article which

warned about the possibility of static damaging the chips when replacing them. However, the retailer who sold me the chips made no mention of it, and I can't find any reference to it in the manual for my computer either. How important is it to protect against static, and more importantly, how does one go about it?

M. Bannister

Static damage to chips is one of those things which is hard to pin down. Many people (myself included) have gotten away with handling chips without taking any special precautions, and have caused them no apparent damage. On the other hand, there is no doubt that static charges *can* destroy the tiny junctions in integrated circuits, but if a chip does turn out to be dead, there is usually no way of finding out whether the cause was static, or something else.

Static is thus a little like AIDS – you might get away without precautions for a while, but eventually the odds will catch up with you, and you'll zap something. In the case of a RAM chip, the problem can be particularly insidious, as it is often difficult to tell which chip is at fault, and the problem can often appear to be intermittent in nature, making tracing the fault even more tedious.

Protection can take one of several forms, depending on the importance of the protection, and the level of static which could be present in the environment. The simplest way to prevent damage is to simply touch the metal chassis of the computer before plugging the chips in. This will equalise any static potential between you and the computer which you may have built up beforehand.

However, if you are standing on nylon carpet for example, particularly in dry weather, simply shuffling one's feet around in the course of installing the chips could build up enough charge to damage a chip or two.

A better solution is to use a conductive wrist strap, as sold by most good computer parts outlets. One end of the strap is wrapped around your wrist, while the other end is attached to the computer which you are working on. This discharges existing static as before, but because it stays connected, any charge which is generated during the course of the operation is immediately drained away before it reaches a dangerous level.

Electronics buffs usually have a number of jumper cables lying around, which consist of a short piece of wire with an alligator clip at each end. One of these clipped to the computer chassis and a metal

watch band (which you're wearing, of course) will achieve the same result.

Also, the forgoing applies to add-on boards, as well as single chips. Although external circuitry on a circuit board provides some level of protection to the devices on the board, there is still a chance of damaging chips on the board with static, and because they are typically soldered directly onto the board, replacement is not a simple task.

When handling boards, it is good practice to avoid touching the connector pins or the tracks on the board – handle the board by the edges as far as possible, and if you *do* have to touch the metal tracks on the board for some reason, consider grounding yourself first, as described above. SIMM RAM modules can be considered to be bare chips for the purposes of static protection. Although SIMMs consist of a few small chips soldered to a small board, the latter provides no protection as far as static is concerned until plugged into the computer.

dBase and DR-DOS

I recently installed dBase IV, version 1.1, into my Datamini 286 AT, which is attached to a Star NX-1000 printer, and running the DR-DOS 3.3 operating system. Every time I attempt to use the printer with any of the dBase print commands, the computer seizes, and I have to reboot to start the program again. As a result, I cannot use dBase IV on this computer. The printer driver has been properly installed.

An Ashton-Tate technician informs me that this is because DR-DOS 3.3 and dBase IV are incompatible. In what way can I solve this problem?

M. Mohanlal

Unfortunately, I cannot think of any way to solve your problem other than changing your operating system. Just as the first attempts at building IBM PC-compatible computers had all sorts of incompatibilities, the same appears to be the case with the DR-DOS operating system. With release 5.0, Digital Research has addressed a lot of the compatibility issues, but it is still far from perfect. I recently tried out a copy, and couldn't get some device drivers to work with it. I didn't have the opportunity to try it out with dBase IV, so I can't comment on that combination specifically. My recommendation would be to get a copy of genuine Microsoft MS-DOS, and change your system over to that. □

DTP HARD

What makes a good hardware platform for desktop publishing work? Mark Cheeseman discusses what to look for in computers, scanners and monitors, to get the most from your DTP software.

DESKTOP PUBLISHING, as we know it today, really came into being when Aldus released PageMaker for the Mac, and since then, both the software and hardware have become more powerful and feature-packed. While people have tried DTP on XT-level machines, the performance is anything but exciting, and a fast AT with at least 2Mb of memory can be considered the entry-level machine for desktop publishing work.

For example, the Ventura Publisher GEM Edition needs expanded memory in order to run its Professional Extension, which

implements all the useful features like column balancing. If the EMS memory isn't there, those features will be disabled. However, PageMaker, which runs under Windows, requires *extended* memory, which is easier to implement on a '286 than EMS, but is slower in operation due to the difficulty in getting the processor back out of protected mode after it has been switched to that mode to access the extra memory.

For this reason, EMS emulators, which make extended memory appear as expanded, are poor performers on a '286. You really have to get a proper EMS card (or a motherboard which has EMS onboard) to get the most out of Ventura without tearing your hair out. This applies equally to any application using EMS on a '286.

Generally speaking, a '386 is probably the best machine for most DTP applications – its improved memory support means that EMS can be emulated without a speed penalty, and without resorting to expensive EMS hardware. Also, you can get faster '386 machines than you can '286s, simply because the '386 can handle higher clock speeds (33MHz) as opposed to the 20MHz maximum of the '286.

For either PageMaker or Ventura, you need at least 2Mb of RAM to run the program properly. Most current '386 motherboards can accommodate either 1Mb or 4Mb of RAM, so the latter is a common configuration, and allows extra memory to run other applications simultaneously (under Windows), or to use as a disk cache (with SmartDrive, for example). To run the GEM version of Ventura, you'll also need an expanded memory manager, such as QEMM from Quarterdeck (distributed by Sourceware, (02) 427 7999). For either the Windows version of Ventura, or PageMaker, the extended memory is handled by the extended memory manager supplied with Windows. Of course, for either of these applications, you need to buy a copy of Windows 3.0, since the single-application (run-time) versions of previous versions of Windows are no longer available.

While the '386 in most cases provides a worthwhile speed improvement over a '286, the same cannot be said, in general, about the next step – to the '486. As we

AVO is a Sydney-based company, which puts together a wide range of machines, including '486s. This 386/33 is in the mid-range, and came with an optional 100Mb IDE hard drive, and SuperVGA card with NEC 3D monitor. AVO can be contacted on (02) 906 2655.

WARE

found with our tests, the '486-based machine was only marginally faster than most of the '386s, and at times, actually slower than the Wyse '386. One of the benefits of the '486 is its fast in-built maths co-processor, which simply isn't used for most DTP work. Our tests revealed that the cache organisation, more than anything, determined the performance of the machine when running real DTP applications.

Caching in on speed

THE MACHINES WHICH we looked at included two 25MHz 80386s, a 33MHz '386, and a 25MHz '486. Common speed indicators (Norton's Sysinfo and Landmark version 2.00) held no surprises, with the 33MHz machine outrunning the 25MHz contenders, and the '486 leaving the lot for dead. So far so good. Of course we realised that nobody buys a desktop publishing system just to see how far the Landmark 'speedo' winds out.

With this in mind, we set up some simple benchmarks based on real-world desktop publishing programs – Ventura Publisher 3.0 (the GEM version) and Corel-Draw 2.0, running under Windows 3.0. These tests consisted of typical operations which take place in the use of these packages, which would be more meaningful to someone interested in DTP than raw benchmarks. The first test was to load and hyphenate a 300Kb (or thereabouts) text file and place the text in the publication. This was where things started to look in-
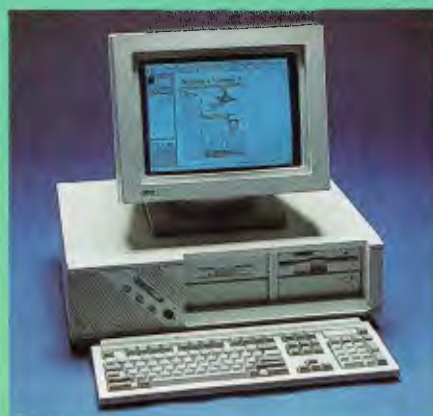
teresting, with the 25MHz Wyse '386 coming in just behind the Intel '486 running at the same speed, and *ahead* of the AVO, which ran at 33MHz.

This was the cause of much head scratching and a corresponding increase in caffeine intake, until I looked more closely at the design of each machine – specifically at the memory caching used by each. All of the machines utilise a high speed memory cache, in order to allow relatively low speed system memory to work with a much faster CPU, without the latter being unnecessarily shackled.

A cache is used because the provision of a full complement of high speed memory (say, four megabytes) would be prohibitively expensive, and the alternative – slow memory running with wait states – sacrifices speed for economy. A cached memory system gets the best of both worlds by allowing the use of relatively slow main memory, while at the same time allowing the processor to operate with no wait states for most of the time.

The basic principle of all caches – memory or disk – is exactly the same. When a word of information (here, 32-bits) is read from main memory by the processor, the cache controller also keeps a copy of the data in the fast cache memory. For this initial data read operation, the data is read from (slow) main memory, so the processor has to wait for a couple of memory cycles until the data is ready.

However, if the processor requires this

The Wyse 3225 is not that company's fastest '386 – they also have a 33MHz model. However its 64Kb cache (as opposed to the 32Kb number in most '386s, and speedy hard disk meant that this machine was one of the hottest tested. Our review machine came from the Great Escape Computer Company, which can be contacted on (02) 693 2022.

The Arrow 25MHz '386 also had a 64Kb cache, although it did not perform quite as well as the Wyse, especially on disk-intensive operations.

The Lightscan 320P, resolves an A4 sheet at up to 300dpi black and white, and resolves grey scales with dither patterns. Call Pactronics on (02) 748 4700 for more details.

Pactronics also has this number, the Lightscan 400P, which consists of a handpiece, for use as a hand scanner, and a sheet feeder for multiple sheet work.

For the Mac fans, the new Mac IIsi, sports a 68030 running at 20MHz, with an optional coprocessor.

The Intel 402, i486-based desktop proved a bit of an enigma. It screamed through the benchmarks, but when timed running Ventura, it got bogged down somewhat, performing only barely better than the Wyse and Arrow machines, and at times slower. No doubt, the model with the external 128Kb second-level cache would make it come out tops, but at a price! For details about the Intel range of machines, contact Intel Australia, on (02) 975 3300.

data again, there is no need to go back to main memory, since the cache already has the data stored in its own high speed memory. If and when this happens, the cache controller provides the data itself, and main memory is not accessed at all. Because the cache memory is very fast, no wait states are incurred, and the processor continues to run at full speed.

Obviously, there is not going to be room in the cache to store the contents of every location in main memory – if this were the case, then it would be simpler to just use the cache memory as main memory – a speedy, but expensive, option. The designer of a realistic cache system has to face the reality that the cache will eventually fill up, and when new memory locations need to be cached, a decision has to be made to determine which data in the cache are to be discarded to make way for the new information.

Also, there is the additional consideration of where in the cache memory to put a given word of data. It would be nice to be able to put the data anywhere in the cache memory; it would then be possible to use a replacement algorithm such as *least recently used*, to determine which data can be thrown out.

The trouble with this approach is that it makes it difficult to find the data again. By the time the cache controller has searched all of the cache memory for the data, the slow system memory could have provided the data itself several times over.

The simplest form of cache is the direct mapped cache, where any given location in main memory can only be stored in one location in the cache. Thus, each location in main memory is mapped to one, and only one, location in the cache. However, because the cache is many times smaller than the main memory, each location in the cache can hold the data from a large number of locations in main memory – one at a time, of course.

So, when the processor fetches data from a particular location in memory, the cache controller checks its corresponding location in the cache, to determine if the data is there. If it is, then the cache data is used, and the processor can carry on without waiting. If it is not in that location, then it is not in the cache, and the request is passed to the main memory.

The problem with this type of cache is that if two locations in main memory which share the same cache location are accessed alternately many times in a short space of time, the cache will always have the *wrong* data, and main memory will

AT A GLANCE, the Radius Pivot appears to be just another A4 monitor. But take a look around the back and you'll see some very impressive structural design. The Pivot is certainly not a simple monitor. As the name implies, it's capable of pivoting around a central position – offering either portrait or landscape orientations at the twist of a wrist (almost). Add to this a swivel base with adjustable viewing angle and you've got a very flexible piece of ergonomic display technology.

The greatest thing about the Pivot is the way it automatically redraws the screen following a rotation. There's no need to invoke any special key combination, re-initialise a driver or restart the computer. Simply rotate the monitor through 90 degrees and before you can say 'I must renew my subscription to *Your Computer* magazine', the screen is redrawn in the new orientation. These features don't come cheaply, so let's see what you get for your money.

Hardware supplied with the Pivot includes the monitor, interface card and cables. The monitor features stylish design and sturdy construction with plenty of ventilation slots. Considering the technical difficulties that arise from keeping the monitor stable and cool in both orientations, the physical design is not surprising.

The display measures 15-inches diagonally, with a resolution of 640 x 864 pixels and a pixel density of 78 dpi. This is denser than the compact Macintosh screen (74 dpi), so images appear fractionally smaller and sharper. Contrast and brightness controls make it possible to produce a very im-

se monitor

pressive monochrome screen image, possibly one of the best available for the Macintosh. The standard interface card also supports 4 gray levels, and is expandable to 16.

Software

ALL RADIUS monitors are supplied with RadiusWare, an INIT/cdev which provides a number of useful enhancements for using large screens on the Macintosh. Some of these features include Enlarged Menu Font (16 point instead of standard 12 point), Tear Off Menus, Screen Saver and Screen Capture (for taking screen shots in PICT2 format).

RadiusWare for the Pivot includes a number of specific software features such as Dynamic Desktop and Finder Cleanup. Dynamic Desktop redraws the desktop after a screen rotation, a brilliant feature largely responsible for the Pivot's appeal. Finder Cleanup re-organises the Finder after a screen rotation, relocating the disk and Trash Can icons so they remain visible in either screen orientation. Under Multi-Finder, it's necessary to switch back to the Finder before Finder Cleanup can do its stuff.

The Pivot is a dream to work with, thanks to its crisp high contrast display and support software. However, it does require some minor changes to your work habits. For example, Finder Cleanup is a useful feature if you do a lot of screen rotation, but it puts the Trash Can directly beneath the start-up disk icon. This can be a bit confusing if your mouse instinctively dives to the bottom of the screen during a trashing operation. On the positive side, positioning the Trash Can towards the top saves dragging the mouse all the way to the bottom of the screen, especially in portrait orientation.

Some Macintosh applications are sensitive to the screen orientation they're opened with, and won't resize their windows after a rotation. Opening an application in portrait orientation and then rotating to landscape often results in the size box and horizontal scroll bar disappearing off the bottom of the screen, where they cannot be accessed. To prevent this, it's a good idea to open the application or document in the screen orientation you intend to use.

The Radius Pivot Monitor is compatible with the Mac II family and SE/30, running system 6.0.5 or later. It is available through Allaw Technologies, (02) 415 9111, and pricing is around $2900. Contact your nearest Allaw dealer for exact pricing. Soft Pivot for IIci and IIsi machines also available for about $2150, using in-built video port.
– Greg Simmons

have to be accessed frequently, slowing the system down. If more than one cache location is involved (probably a block of several locations), then performance will suffer that much more.

A more flexible approach is the set-associative cache, where every location in main memory can be mapped to two, four, or more, locations in the cache. This gets around a lot of the delays which result from the above scenario where the cache is trying to keep track of two (or more) locations in memory. With such a cache, a memory access is checked against the two or four possible locations in the cache.

Most caches in '386 machines use a two-way associative cache, based around Intel's own cache controller, the 82385. This is the cache controller used in the AVO, Syncomp, and Arrow machines. All of these have 32Kb of cache memory, except the Arrow, which has 64Kb.

The Wyse, on the other hand, uses its own direct mapped cache. However, because it is 64Kb in size, its overall performance is better than the 32Kb associative caches in most of the other '386s.

One of the features of the i486 processor used in the Intel machine is its inbuilt cache – an 8Kb four-way associative number. Although it is relatively small, the four-way associativity goes some way towards maximising its performance, but the speed improvement offered by it would probably be less than those in the other machines. However, the '486 can execute many common instructions in less clock cycles than the '386, which accounts for the bulk of the speed improvement of this processor. Intel also has a model with an external second level cache of 128Kb capacity, for those applications which need the best possible speed.

The foregoing discussion has not even touched on the subject of memory *write* operations. Most caches are write-through caches; in such a cache, memory writes are written simultaneously to the cache and main memory. This ensures that updated data is present in the cache, but because it is written to main memory as well, the write operation takes place at the speed of the main memory, complete with wait states.

What gives the Wyse a big advantage is the fact that it uses a posted-write cache – data written to memory is written immediately to the cache, but the processor believes that the data has been written to memory, and can carry on with program execution. The cache controller then takes care of putting the data into main memo-

ry, and, provided the processor doesn't perform another memory access quickly, it isn't held up by the memory write.

Before leaving the subject of memory, there is the matter of disk storage to consider. Since desktop publishing files tend to grow rather large, 40Mb of disk space can be considered a bare minimum for disk storage, but for really serious work, start looking at 60 or 80Mb. If you intend to store lots of bit-mapped images, you could easily double this figure and still run out of space after a short while. If you do need to store a lot of images on disk, consider compressing them using one of the popular 'arc' programs, such as LHARC or PKZIP. Compression figures of 90 or 95 per cent are not uncommon.

Perhaps more important than raw disk capacity is the drive's average access time, especially when handling large files, such as bit-mapped images. The standard drive in most '286 and '386 machines nowadays seems to be the new IDE drives, which integrate the drive and controller into a single package, often with a small cache. They are reasonably fast, starting at around 28ms average access time, and going down from there. These days, you can consider 28ms to be 'slowish', and 24ms about standard, especially for larger drives.

The fastest drive we tested was the 150Mb ESDI unit in the Wyse, which returned a figure of 17ms. However, its data transfer rate of just over 500Kbps was beaten by both the IDE drive in the AVO, and the SCSI in the Intel, both of which returned figures of over 770Kbps. However, in DTP applications, where many files tend to be in use at one time, access time is probably a more important consideration than raw transfer speed.

Video speed

BECAUSE DESKTOP publishing applications require a large amount of information to be displayed on the screen rapidly, especially when the screen is being redrawn, the performance of the video display system is an important consideration. All of the machines we tested had 16-bit VGA cards based on the Tseng Labs ET3000 chipset, and not surprisingly, all returned the same video speed performance under the Landmark speed test – 1290 characters per millisecond. Note that this is the number of characters in text mode, while DTP programs are running in graphics mode, where each character is generated as a graphic image, which re-

quires many more memory accesses per character than text mode.

The VGA's problem is that it is a pretty dumb display controller – it has no on-board graphics processor to off-load some of the graphics workload from the main CPU. This applies equally to the SuperVGA modes which most contemporary cards offer in addition to the standard VGA modes.

The most obvious problem with VGA for desktop publishing work is its limited resolution – 640 x 480 pixels. Even the SuperVGA's 800 x 600 is not really adequate for most work, and the 1024 x 768 pixel mode offered by most cards uses an interlaced display, with its associated flicker problems, and non-interlaced.

Big screens

COMPUTER MONITORS have received a lot of flak of late, primarily because of concerns regarding their ergonomic design and safety issues. Foremost among these are the effect of screen flicker, and the safety issues involved in low-level electromagnetic radiation. This latter issue is one of the more difficult to deal with, as research into the effects of low level, low frequency radiation on human tissue to date have tended to be somewhat inconclusive.

Playing it safe, some countries, notably several European states, have established maximum limits for non-ionising magnetic radiation from monitors, but as yet there is no similar standard in Australia. These sort of standards at the moment are largely precautionary – after all, nobody has proven that magnetic fields *don't* have an effect on body tissue either. Until more research results are available, many manufacturers, such as Eizo, make sure that their monitors conform to these European standards, even for units sold in countries where the standards are not mandatory.

A much more obvious consideration is that of screen flicker. Anybody who has used an Amiga in high-resolution mode will know what I am talking about! Screen flicker arises because the image on the screen has to be updated rapidly, so that it doesn't disappear. As the resolution of screens increases, the amount of information that needs to be displayed each time the electron gun sweeps across the screen also increases.

In order to display this extra information, the display designer can follow one of two paths. Either present each information at the same rate as before, so that a complete screen takes longer to display, and thus, the refresh rate of the screen

drops accordingly. This means that the circuitry in the display card and monitor does not need to be improved to cope with higher frequency signals.

The trouble with this approach is that below a certain rate, the screen flicker becomes noticeable. Even if you can't *see* the flicker on the screen, it can make its effect felt subconsciously, with symptoms such as headaches and nausea, and can bring on epilepsy in those predisposed to this condition.

It is widely known that many 1024 x 768 cards use an interlaced display for this resolution, which has a very noticeable flicker. However, standard VGA can flicker noticeably, because even though its refresh rate in text mode is the ideal 70Hz, in graphics mode (used by all desktop publishing programs), this drops to 58Hz on most cards, which can be low enough to cause eyestrain in some people.

Megavision, who distribute the Eizo range of high-resolution monitors, has a package designed to specifically solve this problem. It consists of a 17-inch greyscale monitor, and a special Genoa SuperVGA card for both ISA and MCA systems. The latter operates at all standard resolutions up to 1024 x 768, in up to 256 colours or greys. The refresh rate is 70Hz in all modes, ensuring flicker-free operation. The Eizo Flexscan 5500 completes the system, which Rudi Hoess of Megavision calls the 'poor man's big screen'. Priced at $2395, it fits neatly between standard VGA monitors and cards, and the higher-end products.

Further up the scale, Megavision has the Eizo Flexscan 6500, which boasts a whopping 1664 x 1200 pixel resolution on its 21-inch screen – that's 6.5 times as much detail as standard 640 x 480 VGA. The card also emulates CGA and Hercules displays, and also VGA with the addition of an add-on card. An on-board TI 34010 graphics processor takes some of the load off the main CPU for certain applications. The monitor also works with Mac II machines equipped with an appropriate video card.

Another monitor/card combination with the same resolution is the Sigma Designs L-View, which has a slightly smaller screen, at 19-inches. The Sigma range is distributed by Computhink, (03) 584 3188, and also includes high-resolution colour displays, and even a 15-inch 768 x 1024 pixel portrait display, for single-page applications, and also models for the Mac.

For those requiring colour display, there's the Flexscan T660, which with an appropriate card (such as Eizo's MD-B12),

can display 1280 x 1024 pixels in up to 256 colours out of a palette of 16.8 million. This monitor is also compatible with high-resolution colour NuBus cards, making it suitable for use with Macs as well.

When looking at a high-resolution card and monitor for DTP use, make sure that it comes with drivers for the software that you intend to use. The drivers for Ventura haven't changed since Version 1.1, but those for Windows 3.0 *are* different to those for previous versions. Make sure that you get a Windows 3.0 driver, and ensure that it works in all three Windows operating modes. It's a good idea to make sure you get a Windows 3.0 driver even if you don't plan on using any Windows applications at the moment, as there is a good chance that you will want to run Windows in the not-too-distant future, with the range of applications that are becoming available for this environment.

If you can't justify a big screen and monitor at the moment for Ventura, then you owe it to yourself to take a look at Soft Kicker. This magic little program replaces the GEM screen driver with its own driver, making your EGA, VGA, or SuperVGA screen behave as a large screen, with only a part of it being visible at a time. Moving the mouse off the screen area causes the image to pan instantly with the mouse, without resorting to scroll bars. Because the image is already in the card's memory, the panning is much faster than is possible with scroll bars. Soft Kicker is distributed by Logo, on (02) 905 1844.

The Sigma Designs L-View gives a 1664 x 1200 pixel resolution with a flicker-free 72Hz refresh rate, making it ideal for displaying double-page A4 spreads. It is distributed in Australia by Computhink, phone (03) 584 3188.

Scanners

THE FINAL PIECE of DTP hardware that some (but not all) people need, is a good scanner. Because of time constraints, we only had time to look at two scanners, both of them made by Lightscan, and distributed by Pactronics. We also intended to test out the Hewlett-Packard ScanJet, but while they could (and did) supply the scanner, an interface card shortage meant that by the time we received the interface card, we had run out of time to evaluate it.

Of the two scanners with which we were left, the Lightscan 400P is somewhat unusual, in that in its basic form, it is a 400dpi hand scanner, albeit one which is capable of scanning the full width of an A4 page. Personally, I am not very impressed with hand scanners in general – the difficulty in keeping the thing running in a straight line, and moving it at an even velocity tend to produce less than ideal results. It is also easy to move the scanner too rapidly, so that some of the image data is lost. The extra width of this scanner solves the first problem to some extent, but it is still difficult to move it evenly over the original.

Enter the sheet feeder. The handpiece of the scanner drops into a separate sheet feeder, making it capable of scanning up to 10 pages in sequence, in much the same way as a fax machine. Paper guides keep the pages straight, and the in-built motor ensures that the scan takes place at exactly the right speed.

I initially had trouble getting this scanner to operate in my workhorse AVO '386, but the problem appeared to be related to an I/O conflict with the IDE disk drive, although I'm not sure. However, it worked without a hitch in a Wyse '386, which had an ESDI drive and controller. The interface card has DIP switches to set the base address of the card to avoid conflicts, although it helps if you know the addresses already occupied in your machine. Similarly, a jumper block allows selection of the interrupt line, and you can also use the extra interrupt lines in AT machines, leaving the lower-numbered ones free for their assigned uses.

The sheet fed scanner is ideal for scanning in multiple pages of original copy, such as text to be fed through an OCR (optical character recognition) program. Pages can be stacked in the sheet feeder, and then automatically scanned as fast as the computer is able to accept the data. This scanner does not support grey-scales, although greys can be dithered if you do need to scan pictures. However, you lose resolution when doing this, so it is really limited to scanning text and line art.
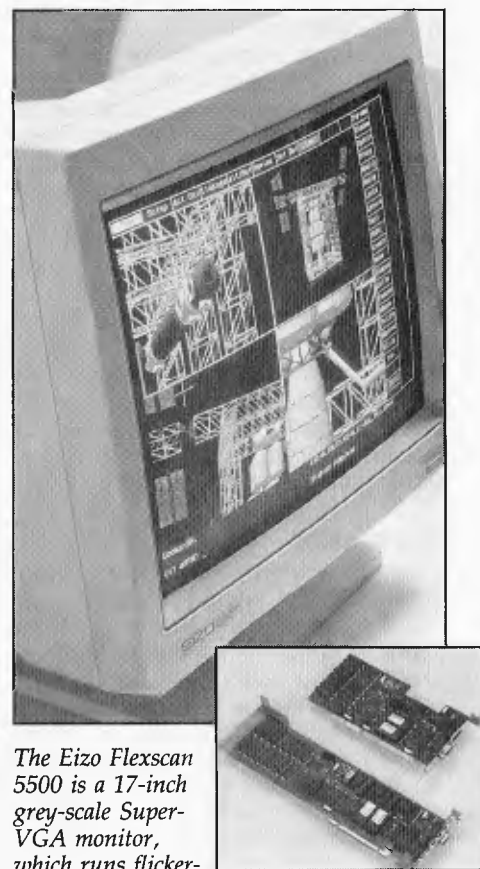
The other scanner we tried was the Lightscan 320F, a 300dpi flatbed model. Flatbed scanners are really ideal for scanning in images, where it is important to be able to align them correctly – DTP packages only let you rotate images in 90 degree increments. The lid of this scanner is hinged in the middle, allowing small adjustments to be made to the orientation of the original without disturbing the placement on the glass top of the scanner.

A flatbed scanner is also the only way to scan images from books, without an intermediate step involving a photocopier, and its consequent loss of quality. This scanner also does not have grey-scale capabilities, so it is really best suited to line art and text scanning. For more details about either of these scanners, contact Pactronics, on (02) 748 4700.

One additional scanner which is worth mentioning might already be sitting in your office largely unused, built into your fax machine. If your fax machine is made by Oki, Lanier, or Harris, then a package from Advanced Solutions, called FaxScan, might interest you. It consists of a special cable which connects between the serial port on the back of the fax machine, and a printer port on a PC, and a disk with scanning software.

The resolution of this system is naturally limited by the fax machine, and will be either 200 x 200dpi, or 200 x 400dpi, depending upon the model of the machine. This is lower than most conventional scanners, but for a package costing less than a hand scanner, it certainly produces much more repeatable results than this option. Also, if the image is to be reduced smaller than its original size, the effective resolution actually rises, and you could easily find yourself being limited not by the resolution of the fax machine or scanner, but by your chosen printer. For information about FaxScan, contact the Australian Manufacturer, Advanced Solutions, on (02) 872 1981.

Choosing hardware for desktop publishing is more involved than most PC applications, simply because there are more components in a DTP system. Not only is it important to select a fast base machine with enough memory, but to that needs to be added a suitable screen and video card, which can often exceed the price of the computer itself. Most DTP work at the moment doesn't need much in the way of colour support, so a monochrome monitor is usually the choice for this sort of work. On the other hand, if you work with colour, there is no substitute for seeing it on-

The Eizo Flexscan 5500 is a 17-inch grey-scale Super-VGA monitor, which runs flicker-free at up to 1024 x 768 pixels, when used in conjunction with the Genoa 6400A 70Hz SuperVGA adapter. The Eizo range is distributed by Megavision, on (02) 975 1877.

screen first.

Many people don't need a scanner, preferring instead to just leave space for any illustrations, and put them in later. This saves on disk space, and also gives superior results, especially with laser-printed output. However, if you need to scan in line-art, or have a use for OCR, then there is no substitute for a good scanner. If you want to scan photographs, make sure it has greyscale capability – at least 16 levels of grey, and preferably 64 or 256.

So what's my ideal dream machine? Out of the machines which we tested, I'd have to put my money on the Wyse 3225 (or preferably the 3233, which runs at 33MHz), with the optional 300Mb ESDI drive. For display, I'll take the Eizo 6500 21 inch mono screen, with its matching MD-B09 driver card; should look good on top of the Wyse. And throw in a Lightscan 320F for scanning in line-art. I suppose I'll need a printer as well – I'd better have a look at Jake's article in for that. □

PRINTING

Laser printers and desktop publishing – you can't have one without the other – or can you? Jake Kennedy put four of the latest lasers through their pages and also found cost-saving alternatives.

TO BE EFFECTIVE, desktop publishing requires a commitment on several levels. The first is a commitment to learning about the hardware and software – the more powerful and flexible the system, the longer it will take; mastering the likes of Ventura and PageMaker usually takes several months of experimentation, with lesser

FOR DTP

ages, a fast computer with several megabytes of RAM and a large hard disk, a 19-inch, high-resolution mono monitor and a PostScript printer. Of course, very acceptable results can be had for much less – a package such as Publish It! running on an XT outputting to a good dot matrix printer with software print enhancement will give satisfactory results for a host of applications, from price lists to newsletters.

Once your applications have outgrown that set-up, a very significant part of your investment is going to be spent on that PostScript laser printer – although, as we'll see, savings can be made here, too. In fact, this is probably the year in which laser printer prices will drop in the same way that '386 prices have come down in the last year. Street prices in the US have already come well below US$2000 and we can expect local prices for a PostScript printer under $3000 before long.

To give a good picture of what is currently available, we selected a broad range of 300dpi (dots per inch) laser printers to evaluate – the Dataproducts 12ppm (page per minute) network workhorse, the LZR-1260i; the latest release of the most cloned peripheral ever, Hewlett-Packard's 8ppm LaserJet III; the 6ppm RISC-chip controlled Qume CrystalPrint Publisher II and Texas Instruments' very popular PS17 MicroLaser. They all have their own 68020 processor except for the Qume. Just to keep those high-end machines honest, we also put Canon's new bubble jet, the BJ330, through the same paces, having given it PostScript with Software Express' GoScript emulator (see the box item, 'PostScript on the cheap').

None of the printers were any problem to set up, once I'd found all the little packing strips and bits of tape and foam. I used them all as Centronics printers and it was merely a matter of plugging them in, hooking them up and installing them for the applications I used (mainly Windows ones). Note that, with the exception of the LaserJet, a parallel cable is not included

Clockwise from top left: Dataproducts' network workhorse, the LZR-1260i; the latest release of the most cloned peripheral ever, Hewlett-Packard's LaserJet III (with a misplaced intray); Texas Instruments' popular and business-like PS17 MicroLaser; Canon's new BJ-330 bubble jet (keeping these high-enders honest); and the RISC-chip controlled Qume CrystalPrint Publisher II.

packages taking commensurately less time. Along the way, users are likely to find themselves learning about memory management, file format conversions, fast ways to backup and hard disk management. Even if you do it all yourself, it will represent an investment of at least several thousand dollars in time before the learning curve levels off.

That's reason enough to consider carefully whether or not your business needs DTP. For many applications, a bureau offers a cost-effective solution – after the copy is prepared, the time involved can be minimal. As the volume and complexity of publishing increase, the costs involved will escalate to the point that serious consideration needs to be given to bringing the work in-house. And – an outside company often can't give your work the priority you want it to have.

It doesn't take long, however, to discover that a full-fledged DTP system can easily cost up to $20,000 plus an operator. That would give you one of the big pack-

Dataproducts
LZR-1260i

Hewlett-Packard
LaserJet III

Qume
Publisher II

with the printers (HP also supply a serial cable as standard) – that will add about $30 to the cost. I installed all the lasers as LaserJets – PostScript is hardware independent.

I was impressed with Windows 3.0 when I found it had a resident driver for the bubble jet (which was still a month away from release here in Australia), but disappointed to find that the results were half as dark as they should be. A call to Canon told me that there was a new Windows driver for the printer and when I installed that, things were as they should have been. Because we are using a very early release of Windows 3.0, I found that I had to get new drivers for most of these new printers. That shouldn't be a problem for new Windows purchasers, since these drivers are constantly being upgraded by Microsoft – after this exercise, I tried the

resident drivers from a later shipment of Windows 3.0 and found that, with the exception of the Dataproducts, all of the appropriate drivers were now included (and that one could well be there by the time you read this).

The quality of the output of all the printers was so equally good, that it hardly seems to be an issue (see Figure 1). Even the solid blacks were just that, unlike several years ago where there was a marked difference between the different families of engines. The only problems that I had with quality were resolved by giving the toner cartridge a shake (to redistribute the toner particles).

Except for the MicroLaser, the supplied fonts should be adequate for most basic DTP applications. While the PS17 has 17 fonts, one of these is a 16.66 pitch line printer, which is much more suitable for

labels than documents. All of the lasers can accept two font cartridges, except the LZR-1260i, which has an optional hard disk for that purpose.

Dataproducts 1260i

THE 1260I IS THE 'top-ender' in this selection: it's designed for heavy use by a number of users across a network and its rated life is about 50 per cent greater than the other lasers in this group – it's solidly built, weighing over 35kg. That and its size, means that it will need a table of its own and, because it's the noisiest when printing of the four, putting that table in a separate room would be a good idea.

This is a machine that comes fully configured: $8995 nets you 4Mb of RAM, an AppleTalk interface, PostScript and a 250-sheet input tray. This is not meant to be a 'personal' printer and appears expensive

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Dataproducts LZR-1260i

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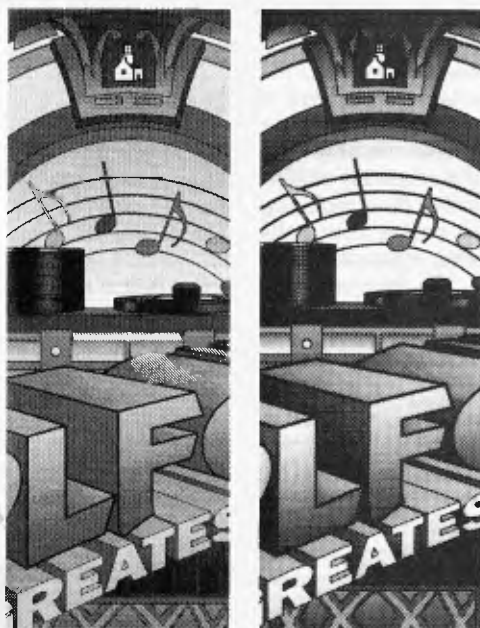ot previously avail-

Hewlett-Packard LaserJet III

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Qume Publisher II

Texas Instruments PS17   *Canon BJ-330*

Figure 1. I used this 132,645-byte clip art file from CorelDraw 2.0 as a test for speed and quality. The LZR-1260i took 572 seconds to print it; the LaserJet III, 490; the Publisher II, 386; and the PS17, 470. The Canon BJ-330 bubble jet took 480 seconds. The toner density of the lasers was set in the middle of the adjustment, except for the LZR, which has no manual adjustment for density. The full image was output on a LaserMaster 1200 typesetting system – also see Figure 3.

compared to the others for that reason – its solidity, the inclusion of AppleTalk and the ability to add a 20Mb hard disk to store fonts, go a long way to justify the price.

The control panel looks complex, with 16 different buttons, but only 8 of them are used in this version of the printer. Changing from LaserJet to PostScript is a matter of: pressing Offline, Setup Menu ('Setup: Software' the LCD panel now reads), Yes ('PS Batch'), No ('HP Laser-Jet'), Yes, and Online. During printing, the LCD keeps you informed with a series of Busy, Processing and Waiting messages, but there is no indication when you walk up to the printer, which mode it is in. I got caught out several times because of this and spent 5 minutes waiting for a non-PS file to print when it was in HP mode.

Speaking of changing modes, like most lasers, even when on a network, there is no way to change from one to the others 'on the fly' – if you are plugged in to the AppleTalk interface and the printer is thinking HP, it's necessary to manually push the buttons.

Dataproducts have always been one of the more forward thinking printer manufacturers and an automatic interface selector shouldn't be too far away on a new model when you read this. Also, the company previewed a PostScript Level 2 printer at Comdex last year – it should be in the local showrooms in May. I haven't seen it in action yet, but the boys at Data-products tell me it's *fast* and supports a new form of data compression and has a forms feature that keeps the form in a cache between pages so that only the information that changes between pages needs to be interpreted.

Hewlett-Packard LaserJet III

BY FAR THE biggest name in laser printers is Hewlett-Packard – in addition to the tens of thousands of LaserJets that have found their way to users since the initial release almost eight years ago, it's probably the most cloned computer product ever. Since this has been the standard setter, I was very interested to see what the latest incarnation had to offer.

The taxed price of $4142 gives you 1Mb of RAM (an additional 2Mb costs $640)

plus a new version of HP's Printer Control Language (PCL) and Resolution Enhancement, and a 100-sheet input tray. PCL 5 (the II series incorporated version 4, and that's what other printers use to emulate the LaserJet) supports font scaling from 0.25 to 720 points – for reference, a 720 point capital letter would be about the depth of an A4 page minus about 3cm. Scalable fonts were only generally available before with PostScript or an emulator. Depending on your application, this could be a money saver – the PostScript option adds $1147. PCL 5 also allows portrait and landscape modes on the same printed page and supports the HP Graphic Language (HPGL) as used by many plotters.

The Resolution Enhancement feature is one that others will be scrambling to emulate: each of the 16,500+ dots per square centimetre that 300dpi (or 90,000 dots per square inch) lasers print can be varied in size and horizontal alignment. This feature is then used to reduce the jagged edges on curved characters and line art. I tried printing a variety of curved lines and characters at various sizes with Resolution Enhancement at its most enhancing setting and with it off: the difference was most noticeable on coated (glossy high quality) paper. On ordinary bond (photocopy paper) it was less obvious as the letters have a slightly furry edge because of the hills and valleys on the surface. It makes enough of a difference that it could save having to go to a bureau for final output.

The LaserJet III has a sleeker look than its predecessors, but the paper tray – now with a lip for easier gripping – still juts out so that it's easily knocked. It still isn't a small printer and needs a table of its own, but it's quiet enough while printing not to be a distraction.

I'd asked for the LaserJet to be supplied in its basic configuration – no added memory and no PostScript. Adding both was easy enough. Loosen three screws beneath the RAM Expansion Panel on the left side of the printer (the screws can't be removed, so they can't be lost) to remove a cover and slide the memory expansion

Texas Instruments PS17   *Canon BJ-330*

Figure 2. I used the Scoop demo file from Ventura as another test of quality and speed: LZR-1260i took 45 seconds to print it; the LaserJet III, 128; the Publisher II, 64; and the PS17, 105. The Canon BJ-330 bubble jet took 64 seconds. Compare the quality of the vase with that in Figure 3.

board in – the one supplied was 2Mb. The manual warns against static electricity and suggests an anti-static wrist strap and grounding plate should be used. In practice this is a bit unrealistic – all that should be necessary in most environments is to hold the card in one hand and touch a grounded piece of electrical equipment. I used the back of my computer case (because it's unpainted) and plugged the printer in to ground it. Once the covers were replaced, it was ready to go.

That was the hard part – installing the PostScript cartridge was a matter of plugging it into one of the slots on the front and turning the printer on – it recognised what it was and that was that. The whole operation took less than 15 minutes.

Switching back to HP mode was just as easy: turn the printer off, unplug the cartridge and turn it back on. There is no way to switch modes from the front panel. Now, if all of your and your colleagues' applications support PostScript – which

they probably will if you all are into DTP – that's not a problem: simply leave it in that mode all the time. If it has to be used in HP and switched, it's something of a nuisance since it generally takes the better part of two minutes to turn the printer off and on and wait for PostScript to initialise.

The LaserJet is still value for money. In its basic form, it is the least expensive of the printers tested, and the fact·that the toner replacement cartridge includes a replacement drum can make for substantial savings over the life of the printer (see the discussion on running costs below).

Qume CrystalPrint Publisher II

THE PUBLISHER II represents a taste of the future – it has a Weitek RISC microprocessor, a liquid crystal shutter is used to form the image (rather than a sweeping laser beam, so this isn't really a laser). And – there is a Network PostScript mode in which a non-PS file can be printed by first sending 'statusdict begin hplj' to the

printer; after printing, it automatically switches back to PS. Plus – Qume have used a controller that allows scaling and rotating fonts even in HP mode.

For all that, it's rather curious that this is also the only one of this bunch where it's necessary to refill the toner cartridge, rather than replacing the entire assembly (if you've ever spilled toner, you know what a hassle that can be).

The price of $4829 includes 3Mb of RAM and PostScript, making it the least expensive of this group in that configuration, and an AppleTalk interface is also standard. Probably the only finesse this machine lacks is that it can't be switched to AppleTalk mode without using the front panel. Unusually, the power plug, on/off switch and density adjustment are all located on the left side of the case. Once the mnemonic codes used on the 2-character LCD panel are familiar – ES for

Figure 3. Once your applications have outgrown a laser printer, Precision Images offers two ways to upgrade your output. The LX6 is a half-sized card for a PC that can have your Canon SX-engined printer producing 800 by 800dpi output. It has 4Mb of RAM as standard (expandable to 6Mb) and comes with drivers for GEM/3, Ventura, PageMaker and Windows. It's priced at $3302 and includes 135 fonts. For professional quality output there are the 8ppm LaserMaster 1000 (about $15,000), which produced the steam engine and the 20ppm 1200 – these are plain paper typesetters offering resolutions of 1000 and 1200dpi, respectively. For more information contact Precision Images (03) 811 9934; fax (03) 813 3979.

FEATURE: DESKTOP PUBLISHING

Emulation Selection, PF, print font information and so on – switching from HP to PS is a matter of: pressing Offline, then Scan Function to scroll through five codes to ES, Execute Function to select, Scan Function to scroll to PS, Execute Function to select and back to Online. The LCD also displays numeric messages that show if the printer is online and ready or if there is a problem (toner low, paper jam and so on). An LED labelled Data Ready flashes when the printer is busy. There is no indication from the front panel which mode it is in (although, in Network PostScript mode that wouldn't matter).

Texas Instruments
PS17 MicroLaser

TEXAS INSTRUMENTS MADE a name for themselves several years ago in the printer world with its OmniLaser range. Then came the MicroLaser 'personal' printers with their cube-like designer case in one of the smallest footprints in the business and quiet, no-nonsense operation. Amongst the desktop publishers of my acquaintance, the PS17 MicroLaser is by far the most popular, and its newer 35-font brother seems to be winning as many hearts.

The base model PS17 MicroLaser is yours for $4222, but to bring it up to the power configuration I reviewed, will take $1440 to add 2Mb of RAM to the standard 1.5Mb. It only comes with a parallel interface, but serial and AppleTalk are available as quite low-cost options (about $180). The input tray can hold 250 sheets.

Although it's not documented in the current release of the PS Micro-Lasers, the printers can be switched back and forth between PS and HP modes by sending a series of escape codes to it. Escape codes can also be used for changing to and from PS Interactive, Epson, Diablo, and Pro-printer emulations, and between installed font cards, paper trays and a variety of other choices. Other than that, switching from HP to PS takes: Off line ('Personal Printer'), Select ('Personal Printer = 2'), Next (twice: '=4'), Select and Online. Like the Dataproducts, the TI uses a rubber

membrane over the buttons, but there is good tactile feedback on the PS17, whereas, it is lacking on the LZR.

Running costs and speed

TO GIVE COMPARATIVE running costs, I made several assumptions: I took the costs of electricity (the variation between printers on power consumption was too small to be significant) and paper as being given. I decided to base the calculations on 20,000 pages over two years (at about 20 per working day this would probably be a job for two operators, sharing a single printer). Also, I took the life of the printer to be three years since that is the time over which the equipment can be depreciated, even though the different manufacturers' rated life span for the machines is ten to fifteen times 20,000.

Note that the results are for comparison only and will vary sharply according to your application: toner consumption, for example, is based on the printed pages being covered with only 5 to 7 per cent toner, but graphics pages with a lot of black, can have up to half the page covered. The cost of toner (and how many pages you can expect to get from a refill) is $240 (5000) for the Dataproducts machine; $187 (4000), HP; $96 (3000), TI; and $228 (7500), Qume. The cost of a replacement drum (and its expected life) is $449 (25,000) for the Dataproducts; HP include a replacement drum with the toner cartridge; $284 (50,000), TI; and $449, Qume.

Working through those figures gave a page cost of $0.21 for the Qume; $0.22 TI; $0.25 HP; and $0.39 for the Dataproducts – that's the same order as the cost of the machines with 3Mb of RAM and PostScript. Although 20,000 pages over two years is a considerable amount of desktop publishing, it's not a lot of printing – 100,000 pages over the same period changes the order significantly: $0.075 HP; $0.076 TI; $0.085 Qume; and $0.13 Dataproducts. As mentioned above, the Dataproducts machine is meant to be a hard-working member of a network – while 100,000 pages will have taken its toll on the other machines in this group, the LZR should still have plenty of life in it. (The robustness of the components, such as the cooling fan and the paper handling components, seem to be the main reason it's noisier than the others.)

In discussing printers, the most misunderstood specification is speed – that ever-quoted 'page per minute' or 'characters per second' rating. The operative word there is 'rating' – most manufactur-

ers quote the print engine's capability, not the actual print speed. Another problem with that rating, is that it does not take into account the time spent processing, which can be significant for large graphics files and, to a lesser degree, PostScript files.

To give a qualitative feel for the speed of these printers, I ran them all through a series of tests: in the first, a 132,645-byte graphics file (the jukebox clip art file from CorelDraw 2.0 which can be seen in Figure 1), the 196,637-byte PostScript Ventura demo file, Scoop – see Figure 2) and a 14-page, 20,000 character text file. The graphics and PostScript files were first printed to disk and then copied to the printer for the test; the text file was printed directly from the word processor.

The results should not be taken as definitive – the ones you get in the real world are going to vary with the application, your computer's speed, the size of the graphics, the complexity of the task and a dozen other things. All I can suggest is that you take your own test file along when you are shopping around and time how long it takes to print.

The results for the text file (with manufacturers' rating in brackets) converted to ppm were 7 for the Dataproducts (12); 6.5 HP (8), 5.5 TI (6) and 4.8 Qume (6). The time to print the first page was typically around 15 to 20 seconds, with the others following quite quickly, so the longer the jobs, the higher these speeds will go (for example, when I tried printing 3 copies of the 14-page test with the Dataproducts laser, it cranked them out at over 10ppm). I did not subtract the time it took the

Figure 4. To make the most efficient use of printers, Diamond Systems on (03) 714 8269, fax (03) 714 8554, have a range of sharers: the Print Q3000 ($741) accepts input from four computers and outputs to two printers – it has a buffer of 256Kb which can be expanded to 3Mb. The Print Q5500 (pictured – $1180) accepts input from four computers and outputs to two printers, with an additional three ports that can be configured for either.

PostScript on the cheap

AS SATISFYING as the results of a full-fledged desktop publishing system can be, justifying the cost can most-often be impossible for anything less than a complete production department, constantly outputting long manuals or numerous short documents. To bring the cost down, savings can be made in every area – use a low-end DTP package, no scanner, a '286 and forget about the laser printer – but the results will be low-end too, and frustratingly slow to create.

Alright, the scanner is often a luxury anyway, but one of the big packages and a '386 would be good – and the money saved by not buying a laser printer or adding PostScript could pay for the difference.

Last month when I reviewed portable printers, I was so impressed with the very sharp and black output of Canon's BJ-10 bubble jet that I wondered how its big brother, the newly-released BJ-330 would work with Ventura and a new version of a favourite PostScript emulator, GoScript version 3.

GoScript works the same as the Post-Script interpreter in a printer, only it emulates it in software using the computer's CPU outputting a raster image file at the highest graphics resolution supported by the assigned printer. It's a powerful program – but hungry. All-up it will eat 5Mb of hard disk and demands at least 550Kb of RAM to run. It can use expanded memory, but you'll need 1.25Mb for an A4 page. Because of these memory requirements it is not set up as a DOS device driver.

Installing the 7-disk set was easy enough from the menus and there was even a BJ driver as well as a whole range of common printers. Within thirty minutes I was printing PostScript patterns as a test.

First I drew the patterns in CorelDraw and annotated them with a variety of fonts and printed them in PostScript to a file. Then to the DOS prompt and *gs filename.prn*. While this is executing, there is enough status information given that even a hacker would be satisfied. In the previous version of GoScript, characters in small point sizes would often have an unprinted space on ascenders or descenders because the place where the printer wanted to put the dot was outside the GoScript outline – this has now been resolved so that characters down to 6pt were almost as well formed as PostScript ones, but there was some deterioration at 4pt (if you're printing in that size, you're probably a master of a shady type who doesn't want it read anyway).

As well as printing PostScript files, GoScript can take any ASCII file and print it in any of 35 outline fonts, from as small as the resolution allows, to the size of an A4 page. Characters can be rotated or printed in landscape or portrait orientation. It can also save a raw bit mapped image to disk – a letterhead or logo, say – and merge it with a PostScript text file during the print. The program also offers a number of shortcuts (cache saving, for example) that cut down on the processing time required on repetitive jobs. And – if you're a master of PS, there is even an interactive mode in which PostScript commands are sent directly to the non-PostScript printer.

Judge the quality yourself from Figure 1. For many applications, it could be all you need, particularly if you are only proofing and sending the work out to a bureau for camera-quality output.

If you do decide to go the bubble jet/GoScript route I'd suggest buying the wide, carriage version of the printer, the 330 – aside from the added flexibility that gives, it will also allow you to print over-size and then have it reduced by camera; this can sharpen the image to such an extent that it is virtually impossible to tell it from Linotronic output. At $1740 for the Canon BJ-330 and $295 for GoScript (Software Express (03) 663 6580 or (02) 519 3155), that makes for some inexpensive quality printing.

GoScript can also be an effective addition to a laser printer without PostScript – it's well worth considering before spending upwards of a thousand dollars on adding PS to your printer.

printers to eject the first page – to do so gives an unrealistic time for real applications. Now, these numbers are interesting if you are only printing letters or using the laser printer as an expensive photocopier, but desktop publishing is somewhat more demanding.

Just how meaningless 'ratings' can be became apparent when I printed the graphics file: the Qume spat it out after 386 seconds; the TI, 470; the HP, 490 seconds; and the Dataproducts, 572 seconds. The results are very much the opposite of the ratings. While these times-to-print are slow, bear in mind that I deliberately chose a relatively large, complex image, so think of them as a worst case example. I've recently seen test results that quote much faster speeds than these, but the image was much smaller – so again, I stress that the only tests that mean anything to you, are those you do yourself.

There are only a few laser print engine manufacturers, so knowing what engine the printer has, makes it possible to apply these 'tests' to other printers rated with the same speed without having to actually perform them. The 12ppm Dataproducts LZR-1260i has a Toshiba engine; the 8ppm HP LaserJet III, a Canon SX; the 6ppm TI PS17, a Sharp; and the 6ppm CrystalPrint Publisher II, a Casio. Of course, while the engines are the same, there will be other features of a brand that will make the printer more or less attractive for your needs at its price (like more memory, larger input trays or a longer warranty).

That story was the same for the Post-Script file, except for the Dataproducts, which printed first, after 45 seconds; the Qume took 64, the TI, 105 and the HP, 128 seconds. That's almost a three-fold variation and brings home the point: don't rely on the sales blurb.

The Canon bubble jet gave a time of 480 seconds for the graphics file and, with Go-Script, 65 seconds for the PostScript file, underscoring its viability as an alternative. For another, but very high quality alternative, see Figure 3.

I am not going to recommend any of these printers over the others – you'll have to make up your own mind. Each has its strengths and weaknesses when considering particular uses. But, I hope I've given enough insight to laser printers for DTP in general, that you are well-prepared to make a rational decision on your own, whether amongst this group or the other offerings out there. □

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What's NEXT with NeXT?

Rumour has it that the new NeXT line will be released here shortly, so we asked Jim Hamilton to report on what we'll see.

THERE'S BEEN A rash of books in California recently on the history of high-technology – and they are all of the 'kiss-and-tell' type. Inside gossip from Silicon Valley pioneers and their executives-turned-authors who have decided that cutting down tall poppies is good for book sales.

Steve Jobs, the 'enfant terrible' of the early days of Apple, has been the prime target. His temper tantrums, pettiness, obvious genius, and his often-irrational management style is natural tabloid press material. Apparently the 'boy genius' hasn't mellowed with age or learned anything in the way of management skills after being thrown out of Apple. A recently 'resignee' executive from NeXT was asked whether he was also planning to write a book about his experiences. He wasn't, he said, because he could sum up the last couple of years with Jobs in only a few words: 'All the other books are true!'

But Jobs' temperament and reputation guarantee his company billions of dollars worth of free publicity every time it releases a new computer. And it must be admitted that everything that Jobs – and therefore NeXT – does is innovative and interesting, so the release of four new products last year is quite an event. Which is why, I guess, that I am here in California writing this overview for *Your Computer* when, on the surface, such an interest in NeXT and Jobs is out of all proportion to their importance in the world of computers.

Only 6000 NeXT machines were sold world-wide since the company was founded, and only a few ever made it to Austra-

lia. And, despite the obvious quality of the new machines, it is still questionable whether NeXT can ever make much impact outside a few university computing departments and perhaps some engineering firms – unless they can forge some strategic alliances – and the company's new marketing arrangement with Canon may help.

Strategic alliances

I'VE ALSO UNCOVERED a couple of fascinating rumours about 'strategic alliances' with the two other important computer companies. These have wide circulation in Silicon Valley.

First of all, there is the claim that NeXT-step (the graphic user interface and programming environment) might be offered for OS/2 by IBM. This story is credited to James Cannavino, IBM's vice president and general manager for personal systems. It carries credibility because John Akers, IBM's CEO, apparently met Steve Jobs at a dinner party a year or so ago, and after some friendly discussion and a few drinks Akers bought non-exclusive rights to NeXTstep from Jobs. It is said that he paid US$50 million to provide IBM with this graphic development interface for their AIX (Unix) machines, but still the IBM engineers are trying to figure out whether or not they can implement it in OS/2.

> *His temper tantrums, pettiness, obvious genius, and his often-irrational management style is natural tabloid press material.*

This rumour takes this relationship a stage further. It says that Akers is wooing Jobs with an offer to bring the whole NeXT structure into IBM to give them a leg-up in competition with the Macintosh and the Mac's user-interface. At the present moment IBM is being held to ransom by Microsoft over MS-DOS, and it is looking increasingly possible that Windows 3.0 will lock them in even more tightly. Given the OS/2 relationship, the rumour makes some sense.

The second story is a counter to the above. It relies on the fact that Apple won a lawsuit against Jobs when· NeXT was originally hived off, and that legal decision gave Apple the right to review all developments and take action if the NeXT computer or their software appeared to be infringing at all on Apple's proprietary rights. Jobs also won some special privileges in the deal; he was allowed to sail very close to the· Mac technology, which is why NeXT has so many Mac-like features. But Apple would certainly take legal action if IBM bought out NeXT.

The rumour has it that Scully and Jobs have now largely settled their differences and agreed that NeXT, with a few modifications, could become the high-end network server – so Jobs may move back to Apple. I find this one extremely unlikely, given the size of Jobs' ego, but I'm only reporting these rumours – not confirming them!

The new products on offer are three computers based on the Motorola 68040 (at 25 MHz) and the NeXTdimension add-in colour board.

The first two mono computers started shipping in November, 1990, and the colour products, earlier this year.

NeXTstation mono

THIS IS THE low-end compact version of the NeXT computer that retails at US$4995 in the States. It comes with 8Mb of RAM, a 2.88 floppy drive and a 105Mb hard-drive. The disk has the Mach operating system and GUI (known as Release 2.0) pre-installed, and the price includes Sony's MegaPixel 17-inch (92 dpi, 1120 x 832 pixel) display, the keyboard and a mouse This machine can be expanded to 32Mb and has an optional 340Mb hard-drive.

NeXTcube

THIS MACHINE IS priced at US$7995. It is an expandable version of the above with extremely flexible configuration options for use as a high-end desktop unit or as a network server. This version has the greatest number of options – expandability, storage, memory and a pathway to high-end colour.

The most obvious change is that they've replaced the old 68030 processor used in the original 'NeXT computer (which required three clock cycles per instruction) with the 68040 (which only needs an average of 1.3 cycles). In terms of speed, this makes the new machines very comparable with workstations having RISC

processors. The NeXT computers are also built around DMA architecture, much like a mainframe.

Both NeXTstation and NeXTcube include integrated memory management (MMU) and floating point units, and the Motorola 56001 digital signal processor (DPS). Jobs was planning to use Motorola's new 96002 DSP which includes floating point capability, but it was late in delivery and cost US$750, so he abandoned the change. However, they've added a SIMM socket for up to 192Kb of memory addressable by the DSP.

On the back-plane of both machines there are also two RS-423 serial ports, a 50-pin SCSI-II connector (which can also handle SCSI-I), a LaserPrinter port and a DSP port. Standard Ethernet (thin) and the 10Base-T twisted-pair Ethernet connections are built-in.

The major physical difference between the two machines is in the size of the box. The NeXTstation is a slim-line box on which a separate monitor fits, while the NeXTcube is, as the name implies, a one-foot cube. Internally they use different system boards, and they differ in space provided for a range of hard-disk options and in the provision of slots (the NeXTstation has none).

The NeXTstation mono. This is the low-end compact version of the NeXT computer, which comes with 8Mb of RAM, a 2.88 floppy drive and a 105Mb hard-drive. It can be expanded to 32Mb and has an optional 340Mb hard-drive.

Jobs has abandoned the optical disk drive as standard, and all machines now come fitted with a 2.88Mb floppy (3.5-inch) – and can have either a 105Mb or the 340Mb (3.5-inch half height) hard-disk drive (there's more options for the cube). The floppy will read and write files in 720Kb and 1.44Mb MS-DOS formats, but it can't read and write Mac files direct. Since the Mac with SuperDrive can convert to MS-DOS, this shouldn't present much of a problem.

The 'cube' model can also handle a 660Mb or 1.4Gb (both 5.25-inch) hard disk, and/or a 265Mb Canon Optical WORM disk or CD-ROM, internally. It has space for two full-height or three half-height devices, and it will have three spare NeXTbus expansion slots in normal configuration.

NeXTcube can also take up to 64Mb of RAM as against the 32Mb limit of NeXTstation, and the 'cube' has nine DMA channels with a 40Mb/sec bandwidth as against eight DMA channels (at 32Mb/sec bandwidth) for the NeXTstation. The cube is the machine for people who may later wish to update to colour, or need the ability to extend their system.

The new colour products to be released this year are the NeXTstation Colour machine, and the NeXTdimension add-in colour-display board. NeXTdimension will upgrade the NeXTcube mono machine to colour, but the board also includes some additional functions in video and image compression not available in the basic 'station' colour machine.

NeXTstation colour

AS YOU WOULD expect, this is a US$7995 16-bit PostScript colour version of the mono NeXTstation. It is a low-end colour machine which is built around a single board with no additional slots, and so is not internally expandable. The colour system provides 12 bits of colour, plus 4 alpha channels for transparency (4096 colours simultaneously) and uses the same Sony 16-inch display and sound box as NeXTdimension. With the exception of the colour display system and main memory (minimum of 12Mb) it is essentially the same as the mono version.

NeXTdimension

THIS IS A high-end 32-bit PostScript colour board at US$3995 which, according to Jobs, 'does 2D colour better than anyone else because we have 32-bit colour PostScript on the screen.' It does many other things besides, including 'near real-time 3D'. (That's it in the opening picture.)

This card takes one of the NeXTcube's three NeXTbus slots, and it runs an Intel 860 processor for graphic processing, and is provided with its own 4Mb of video memory plus an extra 8- to 32Mb of DRAM (in SIMMs) for increasing the windowing capacity.

There are 16 million colours, and the display card includes a graphics accelerator that preserves the feel and performance of the NeXTstep interface. The direction Jobs has taken here is to provide an add-in board that can handle real-time motion video, still and full-motion image compression/decompression and recording to disk, CD-quality sound and complete PostScript text and graphics. These are all integrated into a single system.

If you really want video power, you can install up to three NeXTdimension boards in one cube, each with its separate monitor. Each card has either NTSC or PAL video input and output, and the video sources can be genlocked so the system can be used for closed-caption video production and teletex.

These rumours do point to the widely perceived value of the technology that Jobs and NeXT have developed.

Features

POSSIBLY THE MOST interesting features are the fast colour PostScript capabilities, and real-time JPEG (Joint Photographic Experts Group) video compression and decompression (through a dedicated JPEG co-processor). The video interface lets you connect a laser disk or a VCR (VHS, S-VHS, Hi-8, or Beta) camcorder or a still-video camera without requiring additional boards.

As it has been implemented, JPEG compression lets you take live video, compress it and store it on your hard-disk in real time: you can hold more than an hour of live video on a high-capacity hard disk. JPEG is the new world standard for high-quality still images, (giving about 25:1 compression) and the standard can also handle motion video changes up to 30 frames per second. The full-motion video

(100:1 compression) MPEG standard is now being finalised, and should be available next year, Jobs says.

To take advantage of the in-built digital signal processing for sound, you need an optional SoundBox (at US$125), which integrates a speaker, mike, and headphone jacks with the keyboard and mouse interfaces.

Along with the new machines we have Release 2.0 of NeXTstep, the GUI and development environment, which 'makes the power of the Mach-UNIX operating system accessible to all users'. This is the best interface in the PC business. Release 2.0 system software is binary-compatible with Release 1.0 and adds new features and capabilities. They say that the old programs run much faster on the new system without modification.

There is now more graphical workspace (through the Workspace Manager), and support for integrated fax, colour, DOS (read and write) floppy disks, international versions of applications, and the 040 processor and built-in networking through both thin and twisted-pair Ethernet. The computers also support TCP/IP.

Applications which are designed to work in colour will do so on any of the machines – the system automatically adjusts to the number of colours offered by the individual systems. Colour is now device-independent and can be displayed on any PostScript output device. NeXT claims that the cube is much faster than the Mac fx with colour Quickdraw because they store the entire colour definition in single-frame buffers, rather than using colour mapping tables. The Mac is also more difficult to program and needs conversion to work on PostScript devices.

There are two versions of Release 2.0 . A cut-down model is designed to fit the smaller 105Mb hard-drives and there's an extended version for developers. Both versions support CD-ROM and have FaxReader, VT100 terminal emulation, and System Administration applications.

The extended version includes all current developer tools (such as Interface Builder and the Application Kit), plus some new enhancements. It includes the full *Websters Dictionary*, and it can also include the *Oxford Dictionary of Quotations*, the *Complete Works of William Shakespeare* and the *TEX* document processing system from Radical Eye Software. Mathematica is also provided for higher-education customers only. (The education prices will be about 70 per cent of retail.)

The reduced system has a cut-down *Websters Dictionary* without illustrations

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or the full-text index because you need more than 105Mb of hard disk space or a file server for the other text and image-files.

New product lines

JOBS ADMITS THAT there were weaknesses in the original design and in the software, 'but these have been addressed by the new product lines,' he says. The main complaint was with the slow optical drive, but other problems, like those with the workspace, have now been solved (through multi-threading) – so file operations such as copying and moving can now be sent to the background.

The Mail application is also improved and includes an archive facility and a return-receipt function. Mail can also be directed to non-NeXT recipients, and the spell-checking and rulers have now been built into Text Object, so these are also supported in Mail. You can create messages that include text in a wide variety of fonts, styles and colours, graphics. It can also handle entire documents from any application and these can have voice annotation or even music.

The printing interface has now been given less priority, so it doesn't lock-up during print operations, and it includes an option for sending fax documents if you have a fax modem. If you can print it, you can fax it – simply by selecting the fax option in the Print menu. A directory of user-defined fax numbers then appears and, if you wish, the fax can be transmitted as bit-mapped images.

Release 2.0's Installer now makes it easy to install, compress and remove software, and most applications will come with installer scripts. The compression function allows you to archive infrequently-used programs on the disk.

But all of the above is not much use without applications, and Jobs has obviously been successful in convincing a number of top software developers to pay attention to his new machines.

As you would expect there is a new version of bundled NeXTmail, WriteNow and the Digital Librarian search and indexing tool. Both Ashton-Tate and WordPerfect have new products for NeXT. A-T's offering is PowerStep which is described as a 'nuts and bolts' spreadsheet which is 1-2-3-like, and sells for under US$699, while the new WordPerfect is comparable to version 5.0 on the PC, and sells for US$495.

FrameMaker 2.0 is already the most popular application on the old NeXT machines and 2.1 will be ready soon, and will

The NeXTstation colour. This is a 16-bit PostScript colour version of the mono NeXTstation. It is a low-end colour machine which is built around a single board with no additional slots, and so is not internally expandable. The colour system provides 12 bits of colour, plus 4 alpha channels for transparency and uses the same Sony 16-inch display and sound box as NeXTdimension.

fix some bugs. Lotus will release Improv (a spreadsheet) soon, and there are products coming from Oracle, Adobe, Altsys, Abaton, Novell and about two dozen smaller hardware and software companies.

Owners of the old NeXT computer have an upgrade path for US$1495, which allows them to swap their system boards to get the '040 processor and other changes. They can also add an external 2.88Mb floppy via SCSI port (from Peripheral Land Inc.).

On balance, it appears to me that the NeXTstation mono or colour model with the 105Mb hard disk (or with the floppy only) will satisfy only those users having access to a network.

As a stand-alone, you'll need the 340Mb disk, and you'll probably want the NeXTcube for its expandability. This will bring the mono price to US$9995, and with the colour display and NeXTdimension board, the price will rise to about US$15,000 – which is still reasonably competitive with Sun and Apple, but perhaps not cheap enough to overcome natural reluctance to introduce yet another new standard.

Australian prices will, of course, be much higher. □

AMI PRO –

Since first writing about Ami Pro last August, Peter Phillips has been almost a full time user of this program . . . now he's hooked.

WHEN I TOOK my first tentative steps with Ami Pro version 1, little did I realise that this software package was about to change my life. Journalistic dramatisation mutter the hard heads, but, believe me, it's true. My full time job is education, teaching electronics in fact, but that's all changed. When they said we need quality material for a major project, somehow my name came up. He writes reasonably well they said, and he's not bad on computers.

That was six months ago, and with three major documents completed and several

Scanned images can be readily imported into Ami Pro, and the size of the frame determines the initial size of the image. By 'dragging' the frame, the image can be scaled to fill whatever area is available.

others on the way, the truth is emerging. Ami Pro can deliver the goods. Looking back I cannot see how else I could have developed these documents totalling over 400 pages with around 300 diagrams, dozens of tables, zillions of frames, and all in a ridiculously short time.

The second was even more elaborate, requiring 180 pages, 50,000 words and many, many diagrams mostly drawn using the Ami drawing package. This document took less than a month to produce. The third major document is an 80 page student manual on electronics, again full of elaborate diagrams, tables and equations all developed within Ami Pro. On the way I've also used Ami Pro to produce invoices that use a table with spreadsheet type equations and numerous traditional documents such as final exams, job resumes, and other bits and pieces. In short, I've probably used Ami Pro more than most. I've learnt its foibles and its capabilities and as far as I'm concerned you can keep your WordPerfect, Ventura, PageMaker and Uncle Tom Cobbley an' all.

Block diagrams are easy to draw within Ami Pro – this one took 20 minutes to complete.

FEATURE: DESKTOP PUBLISHING

A PROFILE

When the drawing is outside the capabilities of Ami's draw package, other programs such as CorelDraw! or PaintBrush can be used. These drawings were done in Corel and imported as WMF files.

The equipment

MENTION DESKTOP publishing and most people think of the Apple Macintosh and definitely, oh so definitely, a laser printer. The Mac with its GUI (Graphical User Interface) and its speed at manipulating graphics has been a solid reason for its general acceptance and the poor old IBM genre has flogged along trying to emulate its up market competitor. But enter the HP DeskJet printer and Windows 3.0 and suddenly the IBM looks good. Throw in a PostScript laser printer, a bit more computer memory (minimum of 2Mb required) and a '386 processor, and suddenly the Mac has real competition.

I've developed all my Ami Pro documents using either a '286 or a '386SX compatible coupled to a basic VGA screen. I have access to a PostScript laser printer but decided to stay with the DeskJet as its print quality was excellent, if not quite as dark as a laser printer. In other words, my set up would cost around $3500 and I would challenge anyone to find anything wrong with the final printed product. Obviously a professional publishing outfit would want a higher resolution than 300dpi, and maybe they would find Ami Pro inadequate for some applications.

But many users are like me. They need a good looking document enhanced with diagrams and tables, but they don't want to pay big money for the equipment to produce it. And more importantly they don't want to spend half their time figuring out the software.

Ami's features

THERE ARE FIVE basic facilities within Ami Pro that collectively make it my choice as a desktop publisher/word processor package. These are the drawing package, the import facility, the tables capability, the versatility of the frames and the ability to have several documents opened at once. This latter facility allows anything in one document to be copied quickly to another via the clipboard. But the main feature I want to describe is the drawing package. It's simple, sometimes slow and even tedious, but surprisingly powerful.

To have a fully featured word processor (oh yes, I've long since given up WordStar) and a drawing package all in the one pro-

The Tables feature is very versatile and virtually any configuration can be obtained.

gram, is a strength you only appreciate when the pressure is on. Most of the diagrams I needed to produce were circuit diagrams or line drawings explaining magnetism and other phenomena associated with electricity. I started by developing a library of components and then went on to learn how these can be sized, modified and manipulated when they are appended to a drawing. My only gripe is that the latest version has a bug that prevents exact placement of an object within a drawing. There's probably a simple answer to this annoying problem, as all previous versions were free of it. Space prevents me expanding on the facilities available in the drawing package, but when you realise that 95 per cent of my drawings were developed this way, its latent power becomes more obvious.

This diagram was drawn using the Ami Pro draw facility, in which each component was appended from a 'library' of components developed for the purpose.

Where I needed a relatively fancy drawing, I took advantage of the import facility. In quite a few cases, diagrams were scanned in as TIFF files and pulled into a frame within the document. The latest version is relatively bug free with TIFF files, unlike previous versions, although don't try rotating the image – it takes forever to print, and usually runs out of memory. The other two main formats I've had great success with are the PCX and WMF types, with the drawings coming from PaintBrush and CorelDraw!. CorelDraw! works wonderfully with Ami Pro, and Windows allows you to flip easily between the two. But like good wine, a good drawing takes time, and while Corel can do fabulous stuff, when the deadline is approaching, the Ami drawing package is the quickest way. Also, WMF files take a lot of disk space (50Kb) while Ami drawings (*.G00 files) are very small.

I found that using the Windows Metafile (WMF) format gave the best quality when exporting a Corel drawing, although good results occurred with both the TIF and PCX formats. I occasionally had a few 'terminating application – OK' (?*!&!) boxes come up however, which I traced to problems with WMF files. The cure is simple; go back to Corel and export the diagram again.

Frames

ALL DESKTOP PUBLISHING packages use frames, but none so remarkably well as Ami Pro. A frame is simply an area in which a table, a graph, text or a drawing can be entered. A frame can be a completely separate text document with tab rulers on every line of the text if required. This becomes important for equations, where reciprocals on reciprocals are often required.

Graphics and text can be easily combined by superimposing frames. A drawing (of any type) can be scaled to fit the available space. Frames can be made to appear on all pages, such as one containing the company logo, the date (from the computer's clock), automatic page num-

Equations are always a problem, but by using a frame and the appropriate tabs and styles, virtually any layout is possible. Greek letters are limited, as Ami uses the ANSI character set, although MathType files can be easily imported. However MathType only supports an HP LaserJet or a PostScript printer.

VIRUS ALERT

Invasion of the Viral Kind

Over the past months Virus Alert has informed you of the new active viruses in Australia, their dangers and their origins.

In January we warned of the **Invader** virus, which had at that time, only just been identified in Australia. Today we are both fortunate and unfortunate enough to know more about this Parasitic Resident Boot Sector infector, first isolated in China late last year.

Invader, a computer Virus of epidemic proportions, is hijacking systems throughout Australia, Asia and America, causing a trail of crashed systems (similar to the human destruction of the Black Plague!).

The virus entered Australia 'piggy back' style aboard two different pirated programmes imported from Asia, and is spreading throughout the business sector, warning users of its presence with a merry tune that rapidly deteriorates to a death march.

The first time an infected programme is executed, the virus installs itself as a low memory TSR. At this time the boot sector of the drive where the programme was executed will also become infected. Soon any .COM or .EXE files opened are infected together with any non-write protected diskettes exposed to the system.

After only thirty minutes of being memory resident a melody will be played through the system speaker. This will only stop when the system is rebooted. Booting, however, results in the crashing of the system and the loss of all data.

Another virus that is rearing its ugly head again is the old **Stoned** virus.

Stoned is a Resident Boot Sector infector, first reported in Wellington, New Zealand in 1988, and originally had two variants - one infecting only 5 1/4" floppy disks, and the other infecting the hard disk via the partition table.

Stoned becomes memory resident following a system boot from an infected disk. It then infects any diskette inserted into the system and accessed.

In one out of eight system boot ups, the virus displays the message "*Your computer is now stoned. Legalise Marijuana.*"

Stoned, now with five variations, can be removed by most commercial virus programmes, and while several of the strains are harmless, the variant **Stoned II** has the potential to cause a system crashes if not eliminated immediately.

bering, header and footer frames containing text or graphics. Frames can be duplicated via the clipboard, allowing shadowing and other interesting effects to be easily created. They can have a range of outlines and backgrounds, and frames can be grouped so they all move together. The list goes on, with wrap around, write through and no wrap around attributes selectable from the Frame menu.

Word processing

AS A STRAIGHT out word processor, I have to admit to being sceptical to begin with. I didn't like the idea of having to use a mouse as well as the keyboard, but I now realise it's actually quicker this way. Ami Pro allows two screen presentations, Layout and Draft. The draft mode simply displays text with no attempt to show indents, or how the document will look, although it can be set to use different colours for underlining, bold, italics and so on. And when you want to see how the document will look, a click on the 'toggle to layout mode' icon shows the real thing.

Because Ami Pro operates within Windows, it uses the screen fonts generated by Windows and in some instances the screen fonts are diabolical. For reasons I cannot understand, the Helvetica font cartridge type G for the DeskJet is very clear and accurate, while the type Q cartridge is unreadable. Yet both give almost the same results when printed. As Windows 3.0 is still in its infancy however, one has to expect problems. But with the right screen font, the screen display is very close to the hard copy.

The style sheet concept of Ami takes a little getting used to, but once you master it, the advantages become obvious. Virtually any style can be created, and each style can have attributes such as font size, all text capitalised, italicised, centred, bolded, underlined, overlined, justified and so on. A range of indents can be set, bullets to start each paragraph can be selected from a choice including dots, diamonds, squares, and bracketed numbers or letters that increment automatically. Two very useful attributes are the 'space above' and 'space below' settings, which determine the spacing between paragraphs, in increments as low as 0.01 inches.

Once a style is created, it can be assigned to a Function key, although you can have more styles than Function keys. This way, formatting can be simply a case of hitting a Function key, giving very fast formatting that can be tailored for each

document. The trick however is not to use the same style sheet for all documents, as changes to it will affect all documents that use that style sheet.

Like most word processors, Ami Pro has a spell checker and a thesaurus. The thesaurus gives excellent cross referencing and the spell checker also examines the contents of all the frames as well as the main document, and shows the word count at the end of the check. Unlike many word processors, Ami allows files to be imported from most of the popular word processors, and it will also export to most of these. Some of the typing for the documents I've mentioned was performed by others using WordPerfect or WordStar 2000 – in all cases, the files came in perfectly.

But the facts remain, Ami Pro has allowed me to do something in a time span I don't think I could have achieved with any other program.

Tables

THE TABLES FACILITY in Ami Pro is probably the best around. Although not essential, tables are best placed in a frame to allow the table to be placed anywhere in the document. The features include a large range of outlines, in which every cell in the table can have individual outlines if required. Text in each cell can be centred, imported, formatted using style sheets, cells can be combined to form one larger cell, equations that manipulate data in spreadsheet fashion can be entered into cells and so on. And all so easily and quickly. In fact a table can be a form sheet that occupies the whole page.

Another related feature I haven't used is graphs. By using data from a table a graph can be created, in which a range of graph styles can be selected from a menu.

The limitations

BEFORE I LIST the limitations, it must be remembered that Ami Pro is still relatively new, working in the equally new Windows 3 environment. As a result, there are still conflicts and the likelihood of having the

system hang up is very real. However, you get in the habit of regularly saving (or using the auto save option) after the first time. Perhaps the worst 'gotcha' is the *Rename* function: Ami Pro has its own File Management, which is the recommended way of copying Ami files as this ensures all the associated graphics go with the file; but the *Rename* option seems to have a bug, to the extent that it can totally screw up a disk.

Perhaps the main limitation I found is the size of a document. While a straight text file could probably extend to 100 pages or more, a practical size for a file with graphics and lots of frames is best kept to 20 pages or less. Once the file gets too large, things slow down and error messages start to appear. Ignore the messages at your peril, believe me! There are other problems that crop up from time to time, although I suspect some of these are caused by Windows, such as the screen fonts for some printers, hang ups when you open another program and other nasties that cause you to lose data.

Although not a limitation, I recommend storing all data on floppies rather than on the hard drive. This way all the graphics files (TIFF's Corel drawings and so on) as well as the text are contained on the one disk, allowing the document to be easily loaded into different computers. This doesn't really affect the speed, as the only time lost is when the document is initially loaded. Thereafter, Ami makes temporary files on the hard disk for each file associated with the document. In one case, an 8 page section of one of the documents filled a 1.25Mb disk, so using floppies prevents cluttering up the hard disk. It's also easier to make backups and to keep track of everything.

Summing up

THIS ARTICLE IS not a review of Ami Pro, rather it's a user profile detailing my experiences. There are many more features in the program that I either haven't used or have forgotten to describe. But the fact remains that Ami Pro has allowed me to do something in a time span I don't think I could have achieved with any other program. I didn't have time to learn the software first, all I had was a very tight deadline. My experience with Apple software made Ami Pro easier for me than it might for a DOS user, as many of my work colleagues are now finding. But after seeing the results of my work, they are all secretly admitting that perhaps I was right after all. Ami Pro is the answer. ☐

DO YOU REALLY NEED A LAYOUT PROGRAM?

Get the answer to this question wrong and you can waste hours working on a document, only to decide to start again with a different program. Peter Spencer looks at two alternatives.

YOUR BOSS CALLS you in and tells you that you are responsible for preparing the firm's latest publication to camera-ready stage. You fly to your computer and crank up your preferred page layout program. Right? Wrong. First stop and think. Spend time thinking about the task and planning the job. The first, and most important, question you will have to answer is: Do I need a page layout program or can I do the job more effectively with a word processor?

There are three types of program which you might use for page layout: Word processor, Page layout and Tex. We all think that we know about word processors, but often we use only a small part of their true potential. Word processors get more powerful almost day by day; with a little thought and understanding a good word processor will accomplish tasks which a couple of years ago could only be done with gear costing tens of thousands of dollars. Page layout programs are also changing rapidly and offering scads of features, which not so long ago were only glints in their designer's eye. Tex is in a class by itself. You can do anything with Tex if you know how, but that is a very big 'if'. There is no point in starting with Tex unless you are prepared to spend a lot of time coming to terms with its features. Tex is not for the part-time publisher.

When is a word processor the preferred choice? A word processor may well be best when the layout varies little from one page to the next and there are few graphics. A word processor works well when it is not necessary to layout each page separately — you can set your text styles and headers and footers, and the program looks after the rest. Although you will have to check that page breaks fall where you want them.

Here are three different types of document. For each I considered a page layout program but finally settled for a word processor; not because the word processor was an easier solution, but because it allowed me to get the result I desired. De-

tails given are for Microsoft Word 4 on a Macintosh, Word is also available on MS-DOS machines.

Figure 1 shows pages of short biographies — there are more than 400 pages of these in the book from which it comes. I wanted a line down the centre of the page and at first thought that this was going to present problems. Eventually I realised that the problem was easily solved by putting the dividing line into the header and setting the top page margin to the negative value of the required margin, this prevents Word from increasing the size of the top margin to accommodate the oversize header which thus prints over the text area.

Each paragraph was formatted as 'keep lines together' so that biographies weren't split across columns. Page numbers were in a footer. Four hundred pages is a large document, but Word will handle a document of this size; I prefer, however, to break a large document into several smaller ones and this is also easy in Word.

Because I was looking for the best quality obtainable from a laser printer, the text was set in 12 point and then each page reduced to 75 per cent by the printer, giving an effective 400 dots per inch.

Figure 2 is from a book of mathematics questions. There are 80 pages, many diagrams and mathematics formulae. The mathematics formulae were the main rea-

son for the choice of Word. There are many ways of setting formulae but most of the readily available methods result in a small graphic which is pasted into the final document and cannot be changed except by returning to the original program. Word has an excellent markup language which is easy to use and allows very good control of the resulting formulae. Word also provides a comprehensive formula glossary which allows easy production of common formulae.

There is no problem in pasting graphics into the text, nor in re-sizing them if this is needed.

For a book of this type I normally remove all optional page breaks and pay attention to two page spreads — note the gutter visible in the page preview.

The illustration below is an application form. Word was my first choice here because of the flexibility of its table formatting. It offers variable cell size, cell borders, automatic or fixed minimum cell height as well as all the standard word processing functions to do with styles and positioning. It is also possible to easily insert a PostScript command to place a grey screen over any part of the table ('.row.-wp$box .98 setgray fill' in Word's PostScript style). Once you have experimented for a while you can produce a professional looking table in a short time.

When then would you choose a page layout program rather than a word processor? A Layout program comes into its own when decisions have to be made about the placement of the individual elements, both text and graphic, of a docu-

Figure 1. Using Word on the Macintosh, I was able to add the centre dividing line by putting it into the header and setting the top page margin to the negative value of the required margin.

Figure 2. Word has an excellent markup language which is easy to use and allows good control of the formulae. It also provides a comprehensive formula glossary which allows easy production of common formulae.

ment. The first two documents illustrated are continuous stories, no decision has to be made about placing individual elements and the extra control gained by using a layout program is not needed. Is it stressing the obvious to say that a layout program is best used where each page does have to be individually laid out?

And one last thought. Remember that anyone can learn to use a computer, but a graphic designer has spent years learning the skills required. We don't become expert designers just by mastering a computer program. In an attempt to compensate for this lack, I try and adhere to the KISS (Keep It Simple, Stupid) principle in the hope that a simple layout will also manage to look elegant. Use the minimum number of fonts that you can. Never fall for the trap of using a program feature just because it is there. Justify to yourself every design element that you include.   □

EXCEL 3.0 VS. WINGZ

Jake Kennedy found that both of these spreadsheets for Windows are so feature-packed, they could almost be used as integrated packages.

WINDOWS SPREAD

MOST USERS WILL be familiar with the concept and basic workings of spreadsheets – whether it's VisiCalsc, 1-2-3, Quattro, QubeCalc, SuperCalc, AsEasyAs or any of the myriad others, the principles remain the same. So, I'm going to look at these two power offerings with a view of what the Windows environment adds to the basics. The promise is big and both take advantage of it, particularly Excel (as you might expect of a Microsoft product)

Excel has been with us for some years, but this new version was evidently rewritten specifically for Windows 3.0 – not only is the program file quite a bit smaller, but it only uses about 150K of RAM when fired up. Wingz is a recent port from the Mac world and lacks the 'elegance' of Excel – it uses almost 600K. If you are working with big spreadsheets with only one or two megabytes of memory, that could make the difference in your choice. Also, Wingz doesn't fully support the Clipboard –

Figure 1. *Excel 3.0 treats charts as separate entities – they are embedded in the worksheet and linked to the chart file. Clicking on the buttons, which have macros attached, opens other spreadsheets with a breakdown of the figures.*

Figure 2. *Wingz for the PC treats charts as a graphic object on the worksheet, which allows macros to be assigned to them. Legends are created automatically as a separate object, so they can have their own macros attached.*

many of the formatting options are lost during the cut and paste.

At the minimum, Wingz will take about 1.4Kb of your hard disk, while Excel needs just over 700Kb.

A 'hook' Microsoft has added is the option of using Lotus 1-2-3 help, activated – not unexpectedly – by the '/' key.

As you can see from Figure 3, the Wingz screen (foreground in the figure) is cleaner than Excel's, but the latter has many more commands and functions accessible without having to work through the menu system. However, Excel only displays 19 rows with all menus/bars shown, while Wingz has 22 onscreen. Because of the Wingz toolbox, it shows only 7 columns, versus 9. As can be seen in some of the other figures, both can be set to show only the worksheet itself and the main menu bar – a feature designed for setting up reports and presentations, but it can also give a larger onscreen workspace.

The top menu bars offer a full range of standard spreadsheet functions and adds a few: the Data menu in Excel, for example, is used to create a flatfile database with row and column headings as record and field names – dBase records or selected fields can be written directly into the database. Wingz can also be used to create a flatfile database (it can't read dBase files directly, however). In addition to the Database option on the Wingz Sheet menu, there is also Distribution (for determining frequencies and data ranges), Tables (used for 'what if' calculations with one or two variables) and Matrixes.

If you are trying to make sense out of a mass of data, the Sort features could be useful. In both programs it can be used for ascending and descending alphabetical as well as numeric sorts. While Wingz supports multiple column or row sorts, it does each independently; Excel sorts an entire selected range by either column or row.

'Normal' on the top left corner of the Excel sheet refers to the style of the entire worksheet or selected cells. Styles, whether they are to be applied to the entire worksheet or only selected cells, can be named and recalled later – see Figure 7. The same style options are available from the Format menu style There is a great deal of command redundancy in Excel – once it's mastered, most options can be implemented very quickly and smoothly.

The down arrow next to the Style box displays a list of choices and the next four boxes are Outline tools. As far as I am aware, Excel is the only spreadsheet with a built-in outliner. It can be used to quickly create reports from a complex spreadsheet intended for distribution across a wide range of management levels. It can also be used to keep track of which rows or columns hold independent variables and which formulas. Or, to 'collapse' a large spreadsheet to quickly compare sub-sub-totals, say, in a spreadsheet showing expenses in branch offices.

Outlines can be applied to rows, columns or to both on the same sheet. From left to right, the four Outline buttons are used to promote and demote levels of an outline, turn the Outline symbols on and off (these show the outline levels) – clicking on this button also automatically creates an outline if one doesn't exist. The last button in this bunch is used to select 'visible' cells, that is, they haven't been marked to be hidden.

Speaking of which, there is a Hide option that blanks the sheet in case an untrustworthy type wanders into your office while you've got next year's budget on the

Figure 3. Excel now has a row of shortcut buttons across the top, but Wingz has its own handy shortcuts: the operators below the cell reference. (The ERR in Wingz occurred because the linked spreadsheet isn't open).

Figure 4. In addition to the standard chart types, Wingz has Surface, Contour and Wireframe, greatly enhancing its usefulness for modelling and using it to help make sense of three-dimensional values.

Figure 5. The ability to add notes to cells (and hide them) in Excel is one of the many features that show how much thought has gone into this package.

column to the cell immediately above the active one. It's a useful shortcut to entering the most common of formulas.

The bold-B and italic-I in Excel apply those attributes to a selected cell or range. Like most of the Excel buttons, these options are also available from the menus, with the button offering a shortcut. Wingz uses the Format menu to accomplish the same thing but it takes another step or two. In standard form Wingz has more fonts than Excel – both include Zapf Dingbats, incidentally – but like so many other features of these two, there are more than you are likely to need. Excel makes it easier to define the fonts because the font, size and style can all be defined from the Font sub-menu; in Wingz it's necessary to work through sub-submenus. Cells can be outlined in a variety of line widths, styles and colours. Individual cells as well as the entire worksheet can be shaded and coloured beyond the point of readability or good taste – with so many options available, it's easy to exceed the bounds. An option in Wingz many number-crunchers will appreciate these days is that negatives can be coloured differently from the positive values (the default is red).

The next three Excel buttons align the contents of cells as indicated – another also available from the Format menu in both. Then, on its own, is Excel's marquee selector for graphic objects; Wingz' is located under the Worksheet Tool (the large cross). The drawing tools – the next group of four in Excel – have a good, basic selec-

screen. Wingz also has Hide on the Attributes menu. Hiding is useful for visually highlighting the unhidden cells – I found it made working on spreadsheets like budgets with a number of levels much easier than if all the numbers were on-screen at once.

The Excel button with the Greek sigma is used for automatic and 'intelligent' summations. Click on a cell to make it active, then on the Auto-Sum button and a suggested sum formula is given for the cell. The software assumes you want to sum from the first cell after a blank row or

tion of options. Drawn objects in Wingz can be formatted with a wider selection of options for drop shadow offset, and line style and thickness. Excel has a feature missing from many drawing packages: a choice of size and styles for arrowheads. It also assumes that the arrow shaft was drawn from end to head, and places the pointy bit accordingly.

Using the Control key with any of the drawing tools in both packages keeps the object aligned with the cell grid – that also works with graphs. Wingz adds a Polyline tool with a smoothing feature which can be used quite effectively for drawing free-hand shapes – see Figure 4.

Any of these objects can have a macro (script) attached to it, so clicking on an explanatory text box, for example, will highlight the range of cells from which the value in the cell in question was derived; or, a second spreadsheet can be opened to show the breakdown of the value (more on scripts later). For some reason, both treat arcs strictly as objects, rather than lines; this means they can't have arrowheads added directly to them which greatly limits their usefulness.

The Charting (graphing) tool works the same in both spreadsheets: first select the area to be charted and then the tool; draw a box over the sheet and there it is – both draw a bar graph by default and Wingz includes a legend automatically. This is one area where the two packages differ quite a bit, because Excel treats the chart as an entity separate from the worksheet. Double clicking on an Excel chart gives it a full window of its own (the Gallery and Chart menus only appear then).

The Charts demonstrate an example of 'embedding' a graphic object in an Excel worksheet, and it works in the other direction, too. This makes it possible to, say, include a drawing of a product in a price list done in Excel, or, to include the relevant part of a costing spreadsheet with the original drawing of the product.

In Wingz, the chart remains part of the sheet so it can't directly be saved on its own, nor could I find a way of printing it independent of the worksheet – the background cells can be hidden before printing, but there should be a more straightforward way.

Those limitations are a pity because Wingz has three very powerful charting options: Surface, Contour and Wireframe – these add a modelling ability to the package that takes it beyond the realm of a spreadsheet and will make it useful to a very broad range of users, from geologists

Figure 6. Both spreadsheets have an Arrange Windows option that makes it easy to view multiple files and to cut and paste between. In Excel, links can be created between different files simply by clicking on cells in different windows.

and surveyors to organic chemists – anyone who might be interested in an overview of a mass of data. In both programs, the three-dimensional charts can be rotated around any of the three axis and the depth of field and the vanishing point of the axes can also be set.

Wingz automatically creates a legend and colours each series of data differently. Overall, I found the charts in Wingz were a preferable tool to work with. Aside from the greater choice of chart types, the automatic legend and series colouring, those created with Wingz always seem to be more readable than those created with the same data in Excel. For output, Excel's greater formatting options and flexibility make it the chart-er of choice, however.

It was while using the Charting tool that I discovered a disadvantage in having all of those Excel buttons across the top: there are no keyboard alternatives for those on the far right, which can be a nuisance if you are working with several windows on the screen – it's necessary to resize the window to get to them. It would be more convenient if the button bar wrapped when the window was narrowed as the menu titles do.

In neither program can the charts be

edited directly – it's necessary to work through various menus. I also missed the object orientation of such programs as Pixie in which dragging on a bar to change its value is reflected in the spreadsheet.

After the chart tool in Excel is the tool for drawing a text box (Wingz' is located just above the Chart tool). Excel text can be made to flow vertically and can be centered both horizontally and vertically (Wingz only offers horizontal centering). Both have enough text options and choices to obviate the need for a separate word processor in many cases. You mightn't want to write long documents with them, but for heavily annotated reports based on spreadsheet data, they work quite well.

The Button tools in these spreadsheets coupled with the script languages give users a powerful tool. The Buttons themselves are simply pre-formatted rectangles – when a script is attached to one, the pointer becomes a finger. Most users will be familiar with macros and how they can be used to automate repetitive tasks – for example, a macro attached to any object (not just a Button, although for quick recognition that's what's generally used) can be used to graph values for compari-

Figure 7. Both have an encyclopaedic selection of functions and formulas, but Wingz conveniently divides them into categories.

son from several different sheets, or prompt users for input data, or to format reports, to consolidate several spreadsheets, to highlight a range of values – essentially anything that can be done with the programs themselves and then some.

The macros can be generated automatically with the Record (Excel) and Learn (Wingz) features. They can even be used to add menus, commands to existing menus and bring up user-defined dialog boxes with complex branching – this makes very precise customisation possible and repetitive data input foolproof. Some things, such as creating a new dialog box or customising the menus, cannot be done from within the programs so the script languages need to be mastered (Excel does have its own Dialog Editor, however). Learning the languages isn't as bad as it sounds since both are quite English like; for example –

```
NEW MODAL DIALOG BOX "Update" AT
    (-1,-1)(30 centimeter, 20 centimeter)
DIALOG FILL FG RED()
DIALOG FILL BG WHITE()
DIALOG PATTERN 3
ADD PUSH BUTTON "OK","CANCEL" AT
    (18 centimeter,5 centimeter)+
    (2.5 centimeter,2.5 centimeter)
ADD TEXT "Date changed. Do you wish to
    update worksheet?" AT (1 centimeter,
    1.5 centimeter)+(2.5 centimeter,2.5 centimeter)
USE DIALOG BOX
```

– draws and activates a dialog box in Wingz called 'Update' in the center of the screen. (There are two types of dialog boxes in Windows, the difference being that model boxes need to be closed, usually by clicking the OK or Cancel buttons, and modeless boxes close automatically when an area outside the box is clicked.)

Last on the Excel button bar is the

Camera which takes a snap of a selected area which is then pasted with a mouse click. It differs from the normal cut and paste function in that the paste is independent of the cell grid. In the upper left corner in the Excel worksheet is an unlabelled button – clicking on it selects the entire sheet. The button is also there in Wingz, but it's unmarked.

Figure 8. The Series menu in Excel can be used to generate linear, growth and date series based on a step value in either rows or columns; to make this shortcut even handier, there is a stop value (optional) for the series. In linear series, the step is added to the base and in growth series, it is a multiplier.

Entering data

IN BOTH PROGRAMS, as data is entered it appears in the Entry Box, just to the right of the active cell indicator. Between the two are a tick (click on it to accept the entry) and a cross (cancel the entry); there are any number of other ways to accomplish these actions and without using the mouse.

Both programs automatically wrap a string in the entry box onto the next line when it is longer than 30-odd characters (maximum string length in both is 256 characters). Since Wingz only displays the first two lines, the scroll bars are used to see the rest, while Excel opens the Entry box up to display multiple lines. These multiple lines are entered into the cells as single lines, but there is the option of wrapping them on the worksheet.

Resizing cells can be done in both programs by grabbing the dividing line between the grid labels and dragging it (this also works with a selected range), or, setting the size from the Format menu in Excel. If a numeric string is too long to be displayed in a cell, it is shown, by default in scientific notation (1.9+E19, for example), or as a string of hash marks for dollars and dates. Excel also has a rather thoughtful feature for resizing: Best Fit which sizes a cell or range to fit the longest string in it.

As with any spreadsheet worth its salt, entering data in either of these is straight-

forward: type in the numbers and press Enter or any of the movement keys and that's it. Like most spreadsheets these assume you are entering data in rows, since hitting the Enter key moves to the next cell down. The shareware spreadsheet AsEasyAs has an excellent option for this: after you've typed in the data and pressed the left arrow key, for example, it remembers and moves in that direction the next time Enter is pressed.

Both programs automatically recognise text and numeric strings, but formulas need to be preceded by an equals sign. Numbers can be formatted as text by

Figure 9. Cell and worksheet styles can be set in Excel from this one menu as well as from individual sub-menus; these also allow the other features to be set. This is only one example of the 'redundancy' that makes formatting and other operations very quick in Excel.

preceding them with double quotes (Wingz) or entering it as a formula surrounded by double quotes (Excel). There is every formatting option you might want to use in the default choices – except one: dates as years only. Years can be added as a custom format to both spreadsheets, but if you want a series of years in steps of 5 in Wingz, starting with say 1960 and ending with 1990, the series needs to be generated manually. Excel has its Data Series option which simplifies that and a number of other tasks – see Figure 8.

Wingz has a similar feature in its Sheet menu, but it is somewhat limited in that the start and stop values need to be given or the values are just incremented by 1 across the range. However, the fills aren't limited to single columns and rows, but can fill in both dimensions (down to the end of the fill range, then to the top of the next column of the range and so on). The fill works for dates, as well as numbers.

Entering formulas in Wingz is very quick

because the standard arithmetic operators plus the absolute reference indicator (the $ sign) are next to the Entry bar and can be selected with the mouse. This means that if formulas are manipulations of other cells, they can be entered entirely with the mouse – it's such a good idea that it made me wonder why a numeric keypad can't be popped up for entering numbers.

A feature of Excel that I found a time-saver was that it created a linked reference to a second open spreadsheet when a cell or range in it were clicked on. In Wingz, it's necessary to type in the name of the second sheet to create the link.

Drawn objects in Wingz can be formatted with a wider selection of options for drop shadow offset, and line style and thickness.

Aside from the keypad movements (including Home, its brothers and various logical Ctrl-and Alt-combinations) and the Scroll Bars, the most useful way to move around a big worksheet is to use Excel's GoTo and Find commands, and Wingz' Find: these can be used to locate formulas, text strings and values, as well as cells. The full-scroll of the Slider Boxes in both cases is the active area (or at least two screens in both directions if the data fills less than that). Wingz offers a great convenience when using the sliders: the location-to-be of the highlight is shown in a box next to the bar: no more overshooting when moving long distances.

Both spreadsheets also have methods of moving around selected ranges. For example, in Wingz Enter and Tab move the highlight to the bottom- and right-most cells in the selected area and a sequence of Ctrl-Periods moves from corner to corner of the selection in Wingz. Wingz' Navigator (the compass points in the upper left), while a good idea in concept, has been somewhat wasted in its implementation, I think. A click on any of the arrows moves the highlight to the last 'filled' cell in that direction; if there are no filled cells that-away, it goes to the edge of the Sheet.

Now, perhaps someone does need to go to AVLH32768, but it would be more generally useful if, say, a single click moved the active cell two screens in the direction of the arrow or asked for a cell to go to, and a double click moved to the end of the data range. (Incidentally, Excel's end cell is IV36384 – in both cases that gives worksheets that are going to be limited in size by your hardware).

Of course many of us have been using 1-2-3 and have reams of *.WK* files. Both programs will read these and automatically translate the formulas, except for external references – these need to be translated manually (+<< and >> in 1-2-3 are translated as text). Files can be saved in both as Sylk, text and as 1-2-3 files. To that Wingz adds the DIF format, and both offer various levels of password protection.

Beyond arithmetic

BEYOND THE arithmetic operators – both offer a comprehensive range – Wingz calls them Functions, Excel, Formula. From the menu, Wingz offers over 160 functions and Excel a few less, but the .former divides them into groups which makes them quicker to find and paste into the worksheet. User defined functions, or combinations of existing ones, can be named and called from the menus.

Excel's Formula menu has the Solver and Goal Seek facilities which will be a boon to budget setters. Goal Seek alters a single cell to accomplish the goal, while Solver works over a range. Neither works with formulas however – the original cells need to have straight numeric values in them. Goal seeking and solving can also be done in Wingz and Excel using the Table feature which will work with formulas. One Formula that Excel has that Wingz could use is Arrays; these can be used to produce multiple results from a single operation, or to manipulate a group of arguments from different rows and columns. Arrays can also be used to define look-up tables.

Both of these programs could practically be described as 'integrated': both offer a host of word processing and with a bit of DTP thrown in; both can be used as a simple database and to produce presentation quality graphics; and both offer enough mathematical function to rival all but the most powerful modellers. And – the files from both are compatible with their Macintosh brothers.

The Help offered in both Wingz and Excel is quite complete – almost bewilder-

ingly so, when you first see the respective indexes. Fortunately, if the topic you want is listed in the index it can be reached quickly by typing Alt plus its first letter. Wingz, however, doesn't support Alt plus more than the first letter in searches (Excel does). For example, Alt-M -A -T doesn't take the highlight to Matrix, but the first topics beginning with each of those letters.

Excel uses the standard Windows Help interface with Index, Back, Browse and Search, with Bookmarks for topics. One of the best features of this help system is that the current topic can be printed out. While Wingz doesn't have this feature, it has another that is almost as useful: when the Help window is opened, the Wingz menu bar is across the top; clicking on any of the menu options brings up the relevant help topic. It can be printed out by copying the current screen to the clipboard, pasting it back on to the worksheet and then printing it.

There is no simple choice between them. After using both to accomplish the same set of varied tasks, my feeling is that if I were working in dollars and cents, I'd opt for Excel; if I were working in 'straight' numbers – like laboratory or field observations – I'd go for Wingz. Both offer enough functionality that they open whole new Windows on the world of spreadsheets. □

Product Details

Product: Wingz
Distributor: Informix
(03) 510 2731
Price: $699

Entering formulas in Wingz is very quick because the standard arithmetic operators plus the absolute reference indicator (the $ sign) are next to the Entry bar and can be selected with the mouse.

Product Details

Product: Excel 3.0
Distributor: Microsoft
(02) 452 0288
Price: $835

There is a great deal of command redundancy in Excel – once it's mastered, most options can be implemented very quickly and smoothly.

EXTENDED

MEMORY MANAGER

BREAKING THE DOS 640K BARRIER

Encouraging DOS to use more than the standard 640Kb of memory that IBM first envisaged for the PC has been a complex task. With the introduction of the Extended Memory Specification, standard DOS programs running on '286 and '386 machines can now access memory above the 1Mb limit. Jeff Richards reports.

FEATURE: MEMORY MANAGEMENT

WHEN INTEL designed the 8088/8086 CPU, it was supplied with 20 address lines which allowed it to use up to 1Mb of memory. When IBM designed the PC, they decided to allocate memory above 640Kb for hardware-specific functions – DOS and user programs were allocated the region below 640Kb. With the arrival of the 80286 and the 80386, the amount of addressable memory was increased well beyond the 1Mb limit, but DOS was still restricted to 640Kb.

The Expanded Memory Specification was developed by Lotus, Intel and Microsoft to allow 8086/8088-based PCs to access large amounts of memory. This was achieved by using a 64Kb 'window', located somewhere between 640Kb and 1Mb, to give access to a large memory block that was otherwise invisible to the CPU. Special hardware on the expanded memory board was controlled by an expanded memory manager program to select segments of the memory block to 'map into' the 64Kb window.

Programs could use expanded memory by requesting the memory manager to map selected physical pages of memory into the window, and then addressing it directly. If they needed more than 64Kb, then the memory manager would be asked to map out unwanted pages and map in some new ones. Later advances to the specification allowed for more and larger windows, and even allowed code to execute in the expanded memory window, rather than having to be copied into conventional memory first.

There is, of course, no reason why 80286 and 80386 machines cannot use expanded memory boards, just like the PC can, but these machines can access memory beyond 1Mb, so it seems inefficient to have to use special hardware on an expanded memory board to provide a limited window into the available memory space. Unlike expanded memory, no special hardware is required to use extended memory – the ability to address extended memory is built into the 80286 and 80386 chips. However, this does not mean the task is simple and, for the 80286 in particular, getting the CPU into and out of extended addressing mode is far from trivial.

Despite the difficulties, there is no theoretical reason that programs written to run on these CPUs can't directly access extended memory. However, DOS does not know about or recognise memory above 1Mb, so there is no means of arbitrating amongst different users of extended memory. This is no problem as long as only one program tries to use extended memory at any one time.

This represents an inefficient use of extended memory, because there are a number of pieces of software resident in the computer at one time.

Firstly, RAM drives and disk caches, which are installed as the operating system boots, might be set up to use extended memory if it is available. Secondly, the operating system itself could make use of extended memory to store data buffers or system data. Thirdly, TSR (Terminate and Stay Resident) programs may be able to take advantage of extended memory. And finally (if there is any left over!) applications programs such as a spreadsheet or database may wish to make requests for an allocation of extended memory space. Multi-tasking environments, such as Windows, will try to take advantage of whatever extended memory is available, and will even try to re-allocate it to programs that are executed from within the environment.

Extended Memory Specification

THE NEED FOR a 'supervisor' to arbitrate amongst different users of extended memory was obvious. Thus was born the Extended Memory Specification (XMS) – a software standard by which DOS programs running on 80286/386 machines could access memory above 1Mb in an orderly and controlled manner.

The secret to handling these multiple requests for allocation of extended memory space is a device driver called an Extended Memory Manager (XMM.) This is a special piece of software that is installed when the operating system starts up and which mediates all requests for use of extended memory. This software does for extended memory what the Expanded

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EXTENDED MEMORY

Memory Manager does for expanded memory.

Programs which wish to make use of extended memory can be sure of not interfering with other software by asking the XMM to allocate areas of extended memory to them.

The Extended Memory Specification, formulated by .Microsoft, Intel, Lotus and AST Research, describes in detail the facilities that an extended memory manager must provide. Microsoft's XMM is called himem.

Before considering the process by which the XMM arbitrates access to extended memory, it is necessary to explain why not all extended memory is equal. A quirk of the 80286/80386 processor means that some extended memory is accessible without putting the processor into .extended addressing mode.

The Intel processors

THE PROCESSORS USED in the PCs up to the 80286 use 16-bit registers, and even the '386 should be considered a 16-bit machine when running DOS. In order to address more than 64Kb (2 to the power 16) bytes of memory, multiple 16-bit regis-

ters are required. The high order part of the address comes from a 16-bit register called a segment register. This locates the base memory address at a 16-byte boundary anywhere within addressable memory. The low order part of the address is a 16-bit value which is added to the base address, to give a maximum offset from the base of 64Kb. A moment's thought will raise the question – what happens if the base address is within 64Kb, of the top of memory?

It turns out that if the base address (which is a 16-bit number multiplied by 16) added to the offset address comes out at more than a megabyte, the machine 'wraps around' the address calculation, and the resulting address is somewhere within the first 64Kb of memory. Well, if it is an 8088/86 it does. Whether or not the same thing happens on an 80286/80386 depends on the state of the A20 address line. This is the memory address line that would be activated if an attempt were made to address memory above 1Mb, which is precisely what is happening here. There is, apparently, some software that assumes that addresses calculated in this manner will wrap around, so the default

state for 80286/80386 machines is to disable the A20 address line, and force such addresses to wrap around to low memory.

If the A20 address line is enabled, then software can take advantage of this by setting the segment register to 0FFFFh (say) and referring to memory locations as offsets from this base address. The first 16 bytes of the 64Kb segment will be the top 16 bytes of conventional memory, but the next (64Kb–16) will be in extended memory – above 1Mb. The particular attraction of this odd region of memory is that it is easy to execute code in this address range. Hence this High Memory Area (HMA) is a prime choice for stuffing those TSRs that otherwise take up valuable DOS memory.

The Extended Memory Manager provides special facilities for enabling and disabling the A20 address line. It can also allocate the whole of the HMA to an application, and this allocation can be controlled by the user when the XMM is started, in order to achieve optimum usage.

The XMM functions that are available to user programs involve requesting an allocation of blocks of extended memory, copying data back and forth from conventional memory to extended memory, and then releasing extended memory when the program terminates. To support these operations, there are facilities to determine how much extended memory is available, how large the largest contiguous block of memory is, and what version of the XMS standard is implemented by the installed XMM.

Extended memory block

THE SIMPLEST operation that the user program will perform is to request an allocation of an extended memory block. Allocations are made in units of 1Kb, and the user program can request any amount up to the available maximum. If the request is successful, the program receives a handle – a code number that is used in any future requests associated with the allocated block.

Once it has the handle, the block is available for use. There are two ways in which user programs will access the block. The simplest is to use the block move facility supplied by the XMM. The user passes the XMM the starting addresses of the source and destination and the number of bytes to move, and the XMM does all the work, including arranging for suitable pauses to enable any hardware interrupts to do their thing. The address for the source and destination can be specified in two ways. Firstly, they can be in standard

Direct access with Windows 3

WINDOWS 3 TAKES advantage of the direct access facility when implementing multitasking on '386 machines. When a new task is started Windows will ask the XMM for up to 640K of memory, and will then lock it. By setting up appropriate internal CPU registers, Windows can then turn the allocated region into a virtual machine that will behave just like a standard DOS PC. When Windows wants to switch tasks it simply re-organises the internal CPU registers to transfer processing to a different virtual machine. The speed at which task switching can occur makes it possible for several tasks to run concurrently.

However, since the virtual machine was created by a request to the XMM, there is no reason that the program running in that virtual machine can't also make a request to the XMM for an allocation of extended memory. The request might be made by an Expanded Memory Manager that wants to use the extended memory as pseudo expanded memory! Thus Windows 3 can manage multiple virtual machines, each of which can have up to 640Kb of conventional memory and as much extended and expanded memory as is available.

To pass requests to the XMM the user program must first establish that the XMM is installed. This is done through the same software interrupt that is used by the DOS commands *print*, *share*, *assign* and *append*. If the XMM is installed and active, the interrupt call will return an address that is then used for all future XMM requests. To execute a particular request the program loads certain registers with specific values, and *calls* the entry address. The XMM carries out the requested task, and returns status information in the registers.

segment:offset form, which the XMM takes to be an address in conventional memory. Secondly, they can be in the form of an extended memory handle number and a 32-bit offset from the start of the allocated extended memory block. The most common use of the function would be to move data back and forth between conventional memory and extended memory.

The second means of accessing extended memory is for the program to put the CPU into extended addressing mode, and refer to the extended memory region directly. In order to do this the program

asks the XMM to lock its allocated block. If the lock request is successful, the XMM returns a 32-bit linear address of the start of the block. When finished accessing the block, the program asks the XMM to unlock it.

Direct access to extended memory through the lock request is necessary because the XMM may arbitrarily move the physical location of allocated blocks. Actually, the shuffling is not arbitrary, but would be in response to another program – a TSR or disk cache perhaps, changing its extended memory requirements. By locking the block before accessing it the XMM is prevented from moving the block. Failing to unlock the block after use may mean that unused regions of extended memory are not available to be allocated, or that the available extended memory cannot be allocated as a single, contiguous, block.

Generally, user programs would not bother with direct access into extended memory, and would find the block move facility adequate for high volume data storage. However, multitasking operating systems such as Windows 3 can take full advantage of direct access to extended memory, and can execute code out of allocated blocks without having to first copy it into conventional memory.

Language support

XMM WILL BE supported for languages such as C and Basic through two separate processes. Firstly, there will be third-party libraries which will provide basic access to extended memory for data storage. These routines will check for the presence of the XMM, request blocks of memory, and copy data to and from extended memory. The second level of support will have to be built into the language compilers and linkers. This will involve managing overlays in extended memory, allowing program modules to execute out of extended memory and putting some of the runtime support code into extended memory. Some of this language support is already appearing – for instance, Basic Compiler 7 will move approximately 60Kb of the QBX environment code into the high memory area if an XMM is available.

Effective language support for extended memory through an interface to the XMM means that DOS software can be freed from the 640K barrier. This language support, combined with a multitasking environment such as Windows 3, which itself can make full use of extended memory, means that DOS will continue to grow and prosper despite the attractions of OS/2. □

**STEWART
FIST**

Standards for CD technology

THE PROBLEM WITH technological innovation, is innovation. No one knows when to stop. No sooner do they get some new gee-whiz technology up and running and into the production phases, than some newer, better, faster, one comes along to upstage it. CD-I (CD-Interactive) is a good example – this is the CD-ROM extension technology that allows full-motion video, 16 qualities of sound, and for graphics and text to be mixed on a screen. We've only just begun to get good still-images and sound on our PCs from CD-ROM databases, and now we've got to contend with motion-video too.

Back in 1987, I remember seeing a demonstration videotape of the new Philips-Sony-Matsushita CD-I videodisk system at a Seattle CD-ROM conference. The Philips-led consortium promised the product in the stores by 1989 – so this technology is already a year or two behind time.

The excuse in 1988, if I remember right, was that Matsushita was having trouble producing some of the video processing chips which required 1-micron separation of the elements – and at that time this close spacing created problems in mass production. But what really stalled CD-I wasn't the 1-micron technology – it was DVI (Digital Video Interactive).

DVI is a rival technology invented by the David Sarnoff Research Centre of General Electric, which was shown for the first time at the same Seattle CD-ROM conference. I don't think I've ever seen a company man so down in the mouth as the Philips executive who had just had his world-shattering announcement of CD-I pre-emptively upstaged, by a technology that was probably twice as good.

Disk storage

THE PROBLEM WITH CD-I at that time was in the amount of motion video that could be stored on a CD-ROM disk. This is limited both by the compression ratio of the image and the transfer data-rate. Top video compression ratios in 1988 were about 30:1, and the speed of the laser tracking over the 'pits and lands' of data on a CD disk allows a delivery rate of only 150K a second.

This is OK for audio. At that data-rate you can pack between an hour and 74 minutes of hi-fi sound onto a single 12cm disk, but video needs 25 or 30 images a second. So unless the whole system is changed and the disk spins much faster, this standard transfer data-rate limit means that an average of only 5K (150 divided by 30) of fresh information is available for updating each image. And that's not much.

A single good-quality colour video screen of normal size, requires about a third of a megabyte of information, minimum. And if we are talking about broadcast-quality uncompressed video, this requires a data-rate of about 2.5 megabits per frame (image) or a data-rate of about 10Mb a second. (Bits are used by communications people, while bytes are the preferred measure of computer companies.)

> *The problem with technological innovation, is innovation. No one knows when to stop.*

Fortunately, in an average video scene, images are much the same from one frame to the next, so there is a lot of 'redundant' information. This allows special compression techniques to be developed which only update those parts of the screen that have changed. So you can get higher compression ratios with moving images, as against still.

However, another problem with video is that the amount of information needed to 'update' a frame is highly variable. Sometimes there's very little change, but occasionally the whole image changes – for instance where you change scenes. At this point a totally new full-screen image must be presented instantly and that needs a .burst of data well above the current limit.

You've also got problems with scenes which 'pan' across a landscape, and with zooms or driving shots from a car, where virtually every element of the image is changing constantly for relatively long periods of time.

Initially Philips and Sony worked on reducing these problems by limiting the CD-I motion video window size to about one-quarter of the screen dimensions. They then went to work on data-compression systems and found ways of buffering the image so that they could take out the bursty nature of the 'peaks'.

They had finalised this CD-I standard only weeks before the Seattle conference, and then, to their amazement, the Sarnoff people showed full-motion full-screen video on DVI. It wasn't as good as broadcast TV, but it wasn't at all bad. Such is life!

DVI

THE GE/SARNOFF laboratories were able to get 74 minutes of image on a standard 12cm CD-ROM disk because they had invented some incredible video-compression algorithms which gave a good-enough picture at the required average rate of 5K of screen-updating a second. They had also found a way to handle peak 'load' conditions by increasing the pixel size dynamically so the picture became 'blocky' for short periods of time.

What is more, they had designed two very fast (12 MIPS) chips; one of which handled the real-time decompressing of these images and the other the display – and chip speeds of 12 MIPS at this time were almost unknown in microcomputers.

When you are dealing with the production side of videodisk, you can take all the time you need to compress each image, but decompression must happen at real-time rates of 25 or 30 images a second (PAL vs. NTSC). The compression phase of DVI was so complex that, initially, it took twenty seconds per image-frame using a DEC minicomputer. So a one-hour disk needed hundreds of hours of expensive minicomputer time just for mastering.

Reversing the process was easier, luckily, because it had to be done in real-time. It was an amazing achievement – but DVI

SMALLTALK 'OBJECT-ORIENTED'

Smalltalk/V is a programming language for developing solutions to both simple and complex problems. It has been successfully used for simulation, expert systems, computerised typesetting, and integrated programming environments. You can edit and install small code fragments without lengthy compile and link sessions, building a program piece by piece and seeing the results immediately. You can experiment with bits and pieces of a program long before it is complete, exploring ideas, structures, and algorithms as the program takes form. By not requiring traditional techniques (extensive pre-planning, flow-chart analysis etc.), it is ideal for complex problems whose solutions may not be reachable through such traditional methods. Smalltalk/V uses an object-orientated paradigm which allows you to model systems in terms that match human thinking and language, in terms of objects and actions on objects. As humans, we usually classify knowledge by breaking problems down into more easily handled sub-problems. Smalltalk/V works in the same way by classifying all information into a hierarchy of related characteristics. Throughout Smalltalk/V, you will see how this method of organisation makes Smalltalk/V such a powerful language.
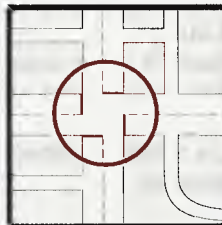
You'll find it doing things you never expected!
It's tracking white-tail deer on the Barrier Islands of Georgia. Dr. Lee Graham, a National Park Service ecologist chose Smalltalk/V to write an application to help manage the white-tail deer population on the Barrier Islands of Georgia. Dr. Graham found that Smalltalk/V, with its visual interface and class structure, is a perfect tool to graphically simulate the complex, ecological interactions of natural systems.

In an emergency room in Vancouver, it's saving lives through animation. What if a medical textbook could come to life? These thoughts led Folkstone Design, Edge Training & Consulting, and Inform Software in Vancouver, B.C., to create the first animated, interactive textbook for emergency room technicians and in-training paramedics. They found Smalltalk/V could easily facilitate a combination of text, colour graphics and animation to illustrate physical processes and the results of medical intervention.

Smalltalk/V is extensible and is largely written in Smalltalk. All the source code is available. Smalltalk has excellent graphic and text editing facilities. A 12-chapter tutorial with source code is supplied. You can upgrade to Smalltalk/V 286, which allows you to take full advantage of your high-speed 286/386 system and enjoy 25 times the memory. There is also the option of Smalltalk/V PM which combines the power of the industry's leading object-oriented programming environment with the richness of a Presentation Manager.

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didn't ever go into production because of the cost of making the chips, and possibly for similar production limitation reasons that CD-I experience.

Along with CD-I, the DVI technology disappeared from the scenes for about 18 months, and they have both only recently emerged again, in time to be greeted by two new world standards – JPEG and MPEG. But before we look at these, let's take a moment to examine some similar technologies. (For more on multimedia and compression, see 'Multimedia takes off' in our November, 1990 issue.)
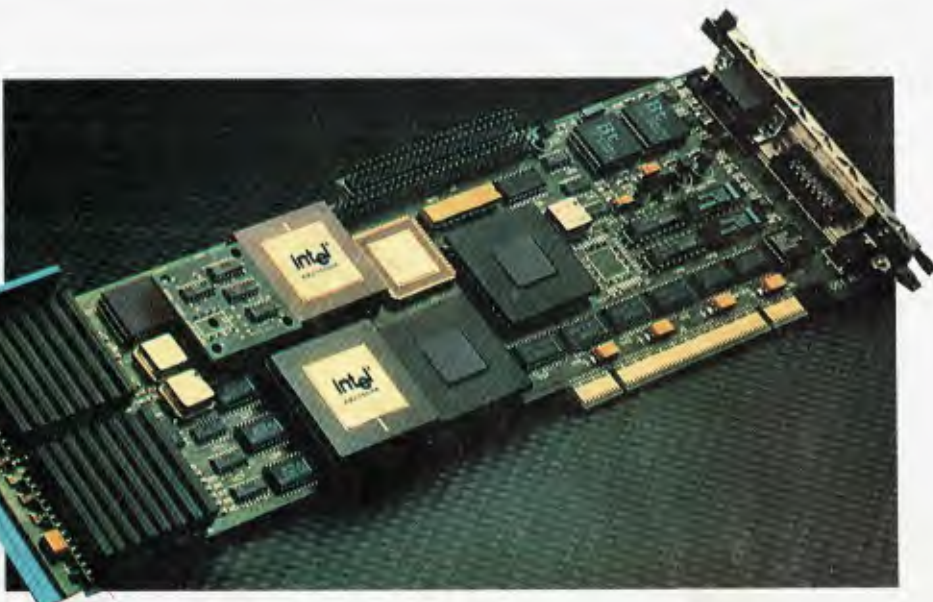
Parallel technologies

THE PROBLEMS OF video-conferencing and videophones are very similar to those of videodisk, and each research effort feeds off the other. But there's also some important distinctions. In video-conferencing you've got to be able to perform both compression and decompression processes in real time – so these systems use a codec (COder/DECoder) which is the obverse of a modem (MOdulator/DEModulator).

The latest in video-conferencing codecs use the new CCITT H.261 standard which allows communications at 'p-times-64-kilobits/sec' data rates. The idea behind the 'p-times' standards definition is that the same basic techniques can be used for slow-rate videophones with small screens at 64 kilobits/sec, or for low-quality video-conferencing units at 128 or 256 kilobits/sec, up to quite good (almost broadcast quality images) at 1 and 2 megabits/sec. (Note that 1 megabit/sec is about 125Kb/sec which CD-ROM can deliver).

A videotape of a prototype video-conferencing unit recently shown by GPT (Plessey) at a Melbourne conference had a motion-quality and image resolution only marginally below our current television reception standard; it was quite exceptional.

The technique that everyone involved in video compression appears to have settled on, is called DPCM/DCT (Differential Pulse Code Modulation with Discrete Cosine Transform), the last of which, if you are mathematically inclined, you will know is a technique derived from Fast Fourier Transform theory.

I thought I understood a smattering of the ideas behind Fourier Transform, but my ego was quickly shot down at a recent video-communications conference, where the first speaker lost me in the first equa-

Intel's ActionMedia 750 delivery board plugs into a '386-based system and does de-compression on the fly, giving full motion video that is almost as good as television. There is a matching board to compress the images. For more information, contact DVI on (02) 878 3022.

In average video scenes, images are much the same from one frame to the next, so there is a lot of 'redundant' information. In this full motion video, for example, the background hardly changes while the snake moves quite quickly. Special compression techniques only update those parts of the screen that have changed. The result is that you can get higher compression ratios with moving images than with still ones.
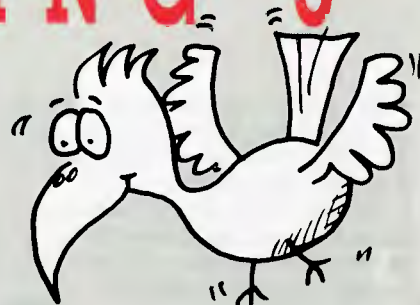
tion on the blackboard – but ignorance has never been a bar to writing about technology, so I'll attempt to explain the basics of what they are doing.

They first digitise each image and store the differences between pixels (not the absolute values). They break this digitised matrix down into blocks of 8 x 8 pixels. The images are then held in a frame-store memory, and one is compared with the other on a block-by-block basis using DCT algorithms.

Motion distinction

THIS STILL LEAVES you with the problem of what to do when large areas of the image are moving quickly. The Eureka HDTV approach is to examine image to detect whether the changes are slow, medium or fast, and then assign different resolutions to the three different block speeds.

The principle is: the faster an object moves across the screen the less resolution it needs. Think of Fred Flintstone – he runs flat-out, the cartoonists simply draw his feet as a blur, but when he they've got to include all the detail. tely, it is the slower movement requires more resolution and they provide more time to transmit that data.

The coding algorithms are intelligent enough to make this motion distinction, and so when a lot of quick movement is taking place on the screen, the amount of detail (the resolution) coded within each block decreases – or to put it another way, the pixel-block size increases.

In the original DVI system you could see this 'blockiness' quite clearly; a really fast zoom or pan (where every image element changed) would result in an image composed almost entirely of rather fuzzy blocks of image, but only for a second – the resolution would return as soon as the image settled.

Ignorance has never been a bar to writing about technology.

Figur wasn't annoying with DVI but it troll noticeable, and if you were producing duc to or film program for use with these systems, you would certainly limit the amount of panning and fast-zooming which wouldn't be a bad idea for many film makers anyway!) used in the production.

A second associated idea incorporates another technique also developed by the Japanese for high-definition television. This is to transmit only every second picture, and reconstruct those in between, by means of an 'averaging' process. Instead of 30 frames a second, you transmit or store only 15, and create the other 15 by constantly comparing one image with the

last, and just halving any differences in position.

This is one of the techniques used by Philips in the new CD-I, but not apparently by DVI (I can't be sure), but the DCT-compression algorithms – or close cousins – are used by both. As you can appreciate, there's a lot of processor speed needed to decompress and reconstruct these images, and you also need large amounts of fast memory to hold a couple of frames of image, which is probably why the original CD-I and DVI announcements were a year or two premature.

But now that the H.261 standard is capable of working at the data transfer rates of a CD disk (and you can do even better if you don't have to compress in real-time) we should soon have full-screen, moderate-quality images with up to 74 minutes of motion video on a 12cm CD-disk fairly shortly.

DVI's early problem was mainly that of the expense. The system worked reasonably well and the algorithms used for compression were advanced (at the time), but the cost of making the two special chips was simply too high for the idea to be practical. GE saw the problem and sold out its patents to Intel, with IBM taking a share.

Intel's chip experience appears to have paid off, and a couple of months ago they announced a new DVI system on a plug-in card costing about $3500 for IBM computers. These cards needed a lot of dedicated processing power and since you also need a CD-ROM drive, the total outlay will be around $7000.

Meanwhile Philips have been working with Motorola and Matsushita on new DCT-based chip sets for their CD-I system. The result is FMV/CD-I (full-motion video CD-I) which matches the DVI in full-screen one-hour videos from a 12cm disk.

The codecs used for video-conferencing traditionally cost about $20,000 each. Yet here we are talking about $3500 DVI PC cards (excluding the drive) which can perform half the functions (decoding only) in real-time. Philips' CD-I looks even better from a price point of view; they recently claimed that CD-I (including the drive) will be sold as a stand-alone home unit that will plug straight into your home TV set, at a retail price of around US$1000 – which is about twice the US price of a CD-ROM drive.

How good both these systems are in practice remains to be seen, but if they are anything like the H.261 demonstration, there's good reason for optimism. The ISO

(Int'l Standards Organisation) is currently examining both DVI and CD-I, but the most likely result is that they will favour the new JPEG and MPEG standards. The ISO committee looking at the definition of these standards was meeting in San Francisco when I was there recently, and unofficially, it was whispered that they had reached agreement.

The principle is: the faster an object moves across the screen the less resolution it needs.

JPEG and MPEG

JPEG STANDS FOR Joint Photographic Experts Group, and they have apparently finally agreed on a technique based on H.261 (and therefore DCT) which provides 25:1 compression ratios and high 'photographic' image quality, which will be ideal for CD-ROM picture libraries. Part of their definition provides for video frame-rates up to 30 images a second, but the JPEG standard doesn't provide the extra compression possibilities that you can get with motion video by comparing one frame with the next – it is primarily a still-image compression technique.

MPEG is the Motion Picture Experts Group version (more an extension of JPEG) which is said to achieve 100:1 compression ratios now, and which may achieve up to 150:1 ratios with the application of more raw computing power from the newer and faster digital signal processors of the future. MPEG1 has apparently been finalised, and that provides for data rates up to 1.5 megabits/sec for disks and video-conferencing, but MPEG2 (with a 10 megabit/sec target) for TV and HDTV has been delayed for about two years.

My understanding is that both Intel and Philips/Sony have agreed to shift over to the JPEG and MPEG standards for disk-based systems. Both of their technologies had been converging anyway and so this gives them a chance to merge into a true world 'standard, rather than spend years fighting for market superiority. Whatever happens, it is going to be an interesting year for video and computer fanatics.

What we are seeing here may be the link between television systems and computers.

JOHN HEPWORTH

PowerBasic

SAY BASIC COMPILER and most people think of Microsoft. After all, they popularised Basic on microcomputers, starting with a vast range of Basic interpreters for all sorts of machines from the early micros to IBM PCs and compatibles. They also created, early in the life of the PC, the command-line driven Basic compiler, sold by both Microsoft and IBM. They followed up with QuickBasic, making major extensions to the language and incorporating the invaluable integrated environment.

But Microsoft is not the only vendor of Basic compilers. Such products come from many publishers. Even Borland, home of Turbo Pascal and Turbo C, published a Basic compiler called Turbo Basic (naturally). Turbo Basic had its own character, advantages and followers, so whatever came of it? Borland decided not to continue publishing it, and Turbo Basic reverted to its original author. Now there is a new version, but renamed PowerBasic 2.0 and published by Spectra Publishing.

PowerBasic 2.0 is a powerful compiler with an integrated environment similar to the Turbo Pascal environment, within which programs are edited and compiled. Programs can be compiled to memory, or to .exe files, chain files or separately compiled units. PowerBasic, like Turbo Basic before it, cannot create .obj files, though .obj files created with assembler can be linked with a PowerBasic program.

When looking at a compiler there are two main areas of interest. These are the dialect of the language used, including any extensions and variations, and the compiler itself, including any built-in editor or integrated environment. Let's start by looking at installing the product, and later at the interesting and very useful additions to the language.

Installation

POWERBASIC COMES with one 3.5- and two 5.25-inch disks, plus a user manual and reference guide, each a bit bigger than A5 in page size and around 400 pages long. The disks contain a number of compressed files and an installation program. Create a directory on your hard disk for PowerBasic, or get some formatted floppies ready if you want it on floppy. Now run the install program on the distribution disk to expand the files and install them.

Integrated environment

RUN PB.EXE and a screen comes up that is very familiar to all users of Borland compilers. Across the top is a ribbon menu with six options, File, Edit, Run, Compile, Options, Debug and Break/Watch. Below it are two windows. The top one is the edit window, taking up most of the screen. The lower one is the watch window, and defaults to only one line high. Either of the windows can be zoomed to take up virtually all the screen. Finally, at the bottom is the status line, with the seven function keys and their uses being shown.

PowerBasic has taken the language used in the original Basic interpreter for the PC, and added its own enhancements.

The file menu has all the expected functions to load and save files, including the ability to write them to a different file name. It naturally allows a change of drive and directory and drop-to-DOS, but a nice addition is the pick list that can display a list of files recently used – a file can be chosen and loaded from the list.

The Edit command on the top line does not open a sub-menu, but transfers the user to the edit screen. Getting back from the edit screen to the menu is a matter of pressing the F10 key. The Run menu is used to run programs from inside the integrated environment, and has the ability to run small, marked blocks of code, and also to display the screen that would be seen by the user.

The compile menu has options to set the main file, choose the destination for the compiled code from four possibilities including Memory, .exe, Chain file and Unit file. The Options menu allows the user to customise many settings. These include the compilers method of operation, and linker options. There are many options for the environment, including auto save, warn on overwrite, creation of backup files, screen size and tab size. There are far too many other options to mention without this becoming a boring list, but, suffice to say, it is easy to set up the environment to suit most users.

Extensive built-in debugging is provided, so that by choosing which variable to watch and setting breakpoints, it is possible to find those elusive and probably inevitable bugs.

The editor has a flavour that is again familiar to the users of any of the Borland languages. The evergreen WordStar commands are supported for block operations, search and replace, and many more, while brief but context-sensitive help is available by pressing the F1 key.

The language

POWERBASIC HAS taken the language used in the original Basic interpreter for the PC, and added its own enhancements. Many of these are similar to those in QuickBasic, but there are many that are unique and many in QuickBasic that are not in PowerBasic. Suffice to say, to exploit either compiler you will need to write code specifically for it and not try to carry programs back and forth from one to the other. Naturally, PowerBasic has sub-programs and functions with local or global variables, making it easy to create structured programs.

As an initial compatibility test of PowerBasic, I took the source code for PC-Talk, a shareware communications program from the early '80s that was written in interpreter Basic, complete with horrible spaghetti code, next to no structure, and lines with multiple statements. To compile this with QuickBasic I had to change the name of one variable, and rewrite one for-next loop that was all on the same line as a

gosub statement. To compile with Power-Basic I had to make both these changes, plus one more. There was a complex (and nearly impossible to interpret) if-then-else-if-then-else-else that was all on one line. A quick rewrite, splitting it over several lines, and all was well. In both cases the resulting programs ran perfectly! Compatibility rating with interpreter Basic is excellent.

Compatibility with code written for QuickBasic will depend on whether or not the various language extensions in either are exploited, but as both products tend to have parallel language extensions, compatibility at source code level is good, though not perfect.

The language extensions in PowerBasic are invaluable. There is no limit on string space, apart from the amount of available memory and any one string being limited to 32,767 characters. This is a great advance on the limits in QuickBasic, which can use large amounts of memory for strings only with quite a few fiddles and problems. There are some excellent array functions, including some that scan arrays for elements that match a variable, and

Being able to use all of the memory for strings overcomes a limitation found by many users of QuickBasic.

others that can quickly sort an array, and add or delete elements from an array.

Peeks and pokes for more than one byte are possible, with integers, long integers and blocks up to 32,767 bytes long being peeked or poked at once. Great for block copy operations in memory! Support for Hercules graphics is included, though this is diminishing in importance these days. Naturally there are a vast number of string functions, like *rtrim$* and *ltrim$* to lop off trailing and leading spaces, *extract$* that returns the sub-string before specific characters, *remove$* to delete specific sub-strings from a string, *using$* to format a string much like *print using*, but returning

it as a string. There are additional data types, starting with Quad-word integers. With 64 bits these are twice as long as long integers. There are binary-coded-decimal fixed and floating point numbers, extended precision numbers and flex strings.

PowerBasic is a valuable resource to long-term users of Turbo Basic, giving them valuable new features. There are far too many to mention all of them here, so I have just touched briefly on a few of them, but they are important enough to sway many programmers to PowerBasic. Being able to use all of the memory for strings overcomes a limitation found by many users of· QuickBasic, and the other new features like array functions are invaluable. All that is needed now for Power-Basic to be a commercial success are third-party libraries like the ProBas and QuickPak Pro libraries for QuickBasic.

PowerBasic 2.0 is distributed by Manaccom, and is available from their many dealers for $195. Phone orders can be made toll free direct to Manaccom on (008) 77 7601, with post and packaging being an additional $5. □

These two ads were created with PageMaker 3.01 at 800 dpi on a Canon LBP-4 Printer

NEW CONNECTIONS

Edited by
Mark Cheeseman

New NetComm models

NETCOMM AUSTRALIA has announced the availability of the TrailBlazer V.32, a modem that combines full compatibility with CCITT V.32 and low speed (2400bps and below) modems with the high performance of Packetised Ensemble Protocol (PEP) modems.

Designed for use in both synchronous and asynchronous environments, the TrailBlazer V.32 modem supports all major industry standard communications rates. It communicates with other TrailBlazer V.32 modems as well as with existing TrailBlazer modems at speeds of up to 19,200bps with data compression and up to 18,000bps without.

Because the PEP technology enables the modem to take advantage of the entire bandwidth of the telephone line, the modem maintains connections on these lines that others using conventional technologies are not able to sustain.

When running in PEP mode, the Trail-Blazer V.32, like other TrailBlazers, adjusts its transmission speed in 100bps decrements when faced with deteriorating lines, rather than halving its transmission speed, as other modems are forced to do. As a result, the modem delivers throughput over ordinary telephone lines many times faster than is possible with other dial-up modems. Performance is also maximised by providing integrated support for UNIX UUCP, Kermit, Xmodem, Ymodem, and SNA/SDLC file-transfer protocols on point-to-point connections.

'With the TrailBlazer V.32, users can now take advantage of the high speed error-free PEP technology while maintain-ing the ability to communicate with V.32 and lower speed modems,' according to Paul Heath, NetComm's group marketing manager.

'High speed connectivity has become a growing concern for businesses and institutions of all sizes as the faster the speeds, the lower the time-related costs. For this reason, organisations worldwide are seeking dial-up communication solutions that allow them to transfer data at speeds greater than 9600bps while maintaining compatibility with V.32 modems and the installed base of low-speed modems.

'The TrailBlazer V.32 offers users the ultimate solution: speed, connectivity and universal compatibility in one cost-effective package,' Heath said.

When communicating with V.32 modems, the modem supports error-free transmission speeds up to 9600bps with Trellis-Coded Modulation (TCM). The modem also offers downward compatibility with CCITT V.22 bis, V.22, V.23, and V.21 as well as Bell 212A and 103J at speeds from 300 to 2400bps.

The TrailBlazer V.32 supports MNP error correction and data compression up to Class 5 for speeds of 9600bps and below. At higher speeds, the modem ensures data integrity with PEP 16-bit CRC error-detection and control protocols as well as delivering PEP data compression.

With the TrailBlazer V.32, users are not required to invest in new data communications programs or modify their existing software. The factory default Conventional Command Mode allows the modem to be configured automatically using any software that supports the Hayes V-series command set.

NetComm has also extended its Smart-Modem range with the introduction of a low cost V.32 model that is ideal for use by business, government, academic institutions and domestic users that need high speed data transmission. The SmartModem V.32 E5 transmits and receives data at 9600/4800bps as well as at lower rates of 300, 1200, 1200/75 and 2400bps.

'We believe we have produced the 'new' standard in general modem communications as the SmartModem V.32 E5 combines the features that the market has been demanding – high speed coupled with performance, reliability and superior technical back-up,' says Heath.

The SmartModem V.32 E5 offers MNP level 2-4 error correction for error free data transmissions, and MNP level 5 data compression allowing even greater data throughput of up to 19200bps.

'The SmartModem V.32 E5 is the ideal modem for users wishing to upgrade to a powerful 9600bps modem but have previously found the price prohibitive,' says Heath. 'Everyone who is involved in standard dial-up modem communications is entitled to do so at high speed and the SmartModem V.32 E5 has made this possible.'

Businesses need high speed to connect branches to head office networks, for wide area networks (WAN) that connect many locations, and for connecting branches to a central database.

Users of time charged communications lines benefit from reduced connection times and a corresponding reduction in costs. Graphic production houses, advertising agencies and related businesses which need to transmit large volumes of data as quickly and efficiently as possible would benefit from the SmartModem V.32 E5's high speed.

The TrailBlazer V.32 modem is available now at a recommended retail price of $2799, while the SmartModem V.32 E5 is priced at $1499. For more information, contact NetComm, (02) 888 5533.

BIZTeL SENDFaX for Mac

PROVIDING A NEW market alternative in communications technology for Macintosh users, local modem designer, developer and manufacturer BIZTeL Products is releasing its SENDFaX fax/modem which operates with third party Macintosh software.

The latest product release signals BIZTeL's intention to commence marketing strategies in new niche markets with its versatile SENDFaX package. Targeting the Macintosh user market and executives requiring Macintosh business communication tools.

In addition, BIZTeL Products is also releasing an application interface specification package for program developers working in communication fields. The release signals the company's ongoing market commitment to open architecture hardware products.

The new SENDFaX version enables users to automatically send faxes in Macintosh file formats from their Mac or PC to a Group III facsimile machine or fax/modem as well as accessing electronic mail at 2400bps data rates.

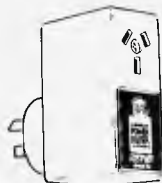New features of the SENDFaX Mac Pack

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The future of comms

Andrew Einspruch asked Chris Howells, managing director of NetComm, about the portable office and the future direction of communications . . .

Do you see the portable office being used in your customer base?

No. NetComm backed away two years ago because we didn't feel confident there would be volume in sales. To technologists like you and me, it's very attractive, the prospect of taking everything with you. We recently came back from the UK where we spent a fortune on faxes in the hotel. It would have been useful to have a device you could plug into the hotel telephone to send and receive information at high speed. You could then play with Lotus and that sort of thing. Those days will come, but it will be less of a portable office and more of a portable personal computer with substantially more functionality than at the moment.

How soon do you envisage 'those days'?

The technology is here for internal high-speed modems, internal fax modems, and software for both. The technology is probably one to two years away before you can also satisfactorily send and receive voice messages with a PC. Many of the components needed for this device are coming out of the normal computing world — bigger CPUs, bigger memories, faster processors. Clearly you need all of

these commonly available at reasonable prices.

What software changes are required?

Not a great deal. We use QuickMail internally and can now handle voice annotation. It's fairly simple now to get sound processing into the Macintosh part of the personal computer world. Presumably the IBM part will follow in the next six to twelve months. But voice annotation is becoming no big deal.

Why is the market not there?

I don't think the users are aware of it yet. Lots of guys in office environments, like me, have a secretary. Mine tends to handle most of my phone messages. But if we're both away, they get lost. If I could easily connect a phone into a PC and use it to give out a voice message, 'I'm sorry, I'm not at my desk. Please leave a message,' it could then record the message. If pre-programmed, it could hunt me out through the building's local area network. Potentially, if we integrate these things, it could page me by radio pager or send the message to me through the wide area network worldwide. In the not-too-distant future, you'll be able to integrate very small cellular telephones. That's one area where NetComm is very keen to get involved — portable communications.

So what does the future look like for portable communications?

I have examples of the new micro cellular product from the United Kingdom. [Shows a CT-2 telephone handset.] There is a base station 20 metres from here, but we have tested it diagonally from one corner on the third floor to the other diagonal on the lower ground floor. And it works. You can see the footprint is close to folding into an internal PC unit.

Ultimately, if you have a portable PC which you use for communications, being

constrained to plugging into the wall means it's not terribly portable. You need true wireless communications. CT-2 is available in the UK. There is a clear definition for CT-3, and pico cellular, or personal communications network is also well-defined. In a parallel development, Motorola is putting 77 satellites into a low earth orbit, and proposes to run a private communications network using their own mobile radio telephones. So the prospect of radio frequency transmission for mobile voice and data worldwide is very close.

By 1995, all this will be up and running. The technology will be small enough to put into personal computers. The communications links will be there by 1995, and certainly the PC power will be. By 1995, the 80486 will be yesterday's technology, and I presume Motorola will have

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include convenient point and select pull down menus, easily operated by the keyboard or mouse and an auto-dial 2400bps modem with fax transmission capabilities.

The new software and hardware combination gives users access to help windows for performing specific operations and a menu select feature operated via the Menu Bar.

The SENDFaX Pack provides Mac users with a wealth of different terminal emulations, allowing them to connect their computer to remote systems. These include TTY, DEC VT102, VT100, VT52 and ANSI

emulations. When required, the software can also be used in a direct connect mode.

A comprehensive list of transfer and error correcting protocols are supported including Xmodem, Ymodem and Kermit. Kermit is supported in both Super Kermit and standard Kermit protocols. The latter protocol type being particularly useful for users transferring data to mainframe computers.

The new SENDFaX Mac Pack combines all the existing features available with the company's Allegro 2424SA modem, along with enhanced software capabilities.

These include single or group transmissions, auto-dial facilities, and a fax phone list for frequently used numbers. Macintosh graphics are available in a selection of Quark fonts and can be merged onto the same page as text when required. There is also a transmission delay facility, a background send feature, fax cover page generation with current date and time and a free-form message area.

BIZTeL's new SENDFaX Mac Pack provides a unique solution to desktop communications for existing and new Mac users. For general office needs SENDFaX's

done an equivalent leapfrog in their 68K series. I reckon you'll carry around PCs with 30- or 40Mb of main memory. Disks are already into 200 to 300Mb on single platter fixed disks, and we'll probably have exchangeable read-write optical disks by 1993 or 1995.

How will that change the way we do business?

I'm not Nostradamus or Jules Verne, but I know what I want, personally. I can recall business trips to the US in '82 and '83 when facsimile was not widely available. I may have phoned once or twice in a one-week trip to transcribe bits of work. On my last trip to London, we had two or three faxes per night coming out of Australia. We'd phone 5:30am UK time to Australia to pick up the end of the day here, then again at the end of our UK day, which was morning here. Years ago, we got reamed by hotel charging, but now we've moved to Telecard, which uses toll free reversed charges. You pay the hotel a toll free cost, but not three times the ISD rate.

Ultimately, I see the portable office of 1993 as a compact laptop with integrated voice, data and fax, which will also do your word processing, graphics, spreadsheet, and database. Within 2 to 3 years you'll be able to attach visual messages and voice annotation to those data files. You may have a small scale scanner, and it's highly likely to have mobile radio telephone capabilities.

With CT-2, you have to be close to the base station. Could you explain CT-3?

CT-2 supports outbound calls, but not inbound. With CT-1, every two seconds your phone talks to the network, 'I'm here, I'm here.' The base stations arbitrate who will handle the call according to who has the strongest signal, and there may be a hand-over from one cell

to another. CT-2 can't handle dynamic hand-over, so the network can't keep track of where you are. With CT-2, the base station is mountable in your home or office, and you can ring into that, so you can get incoming calls provided you're within 200 metres of your base station.

CT-3 supports the cell hand-over, so you have inbound and outbound calls. Beyond that is personal communications network or pico cellular. CT-2 and CT-3 are micro cellular – 200 metres. PCN is a pico cell: 10, maybe 20 metres. CT-1 runs at half a watt, and if you stick it in a car, it goes up to 3.5 watts, giving 16km of range. CT-2 runs 10 milliwatts. I don't know the power ratings for PCN, but I presume it's almost solar powered stuff. You would then have very low-cost transmitters located in light fixtures.

Where does it go from there?

Your guess is as good as mine. I think the whole personal computer technology spectrum is just marching forward. I spent fifteen years in the mainframe world. Mainframes were centralised processing, and attached to that was a management bureaucracy, which ultimately forced the user to say, 'I can't get out of the system what I want. And who are you as a systems analyst to tell me what I can and can't have?'

I find it particularly gratifying that personal computers have freed people to use their own intelligence at their own speed in their own fashion. All these technologies mean that people can do bigger and better things. They can handle a broader perspective, make better-informed decisions, and interrelate better with one another. As individuals, they will be more productive, and the organisations they work for will be more productive. The whole thing is going to start to click.

theme was *Celebrating 20 years of Australian Systems and Software.*

'Users will see a simple, continuous and consistent interface to the system across all applications,' he said. 'The network will join people into a workgroup.'

The theme of integrated computing services was reinforced by another guest speaker, Brian Coombes, Consulting Systems Engineer with IBM Australia: 'Computing services will become a utility in much the same way that telephones and electricity are today. In which case they must be always available, easy to use, highly reliable and consistent,' he said.

Coombes said that data processing departments in companies will have to change their methods of operation, because users will no longer accept the system being taken off the air so that traditional system maintenance can be performed. Twenty-four-hour-a-day availability and reliability will be looked upon as the norm.

'Also, the user interface must be simple and robust so that it meets the expectations of users who have grown up with sophisticated home computers running easy-to-use games,' said Coombes.

Fresh utilities for NetWare

FRESH TECHNOLOGY Group of Gilbert, Arizona, recently announced the release of Remote Console. Remote Console allows authorised users of NetWare LANs to view the screen and operate the keyboard of the file server console from any workstation on the network. Remote Console uses only 2Kb of file server memory.

Remote Console is compatible with Novell NetWare 286 2.1x, using the latest in VAP (Value Added Process) technology. Remote Console also supports NetWare 386 3.x, operating as an NLM (NetWare Loadable Module).

An authorised user may view the file server console from any workstation on the LAN and execute commands that can only be performed at the file server. Remote Console allows access to the console of a non-dedicated file server, even when it is in DOS mode.

Remote Console's capabilities allow privileged users to operate file server consoles over bridged servers and mixed topologies. When Remote Console is used in conjunction with remote access communication software, authorised users can view and operate the file server console from a remote location.

latest model offers a versatile, fast and cost-effective solution in Mac formats at a modest premium.

The package carries a 24 month warranty, and is priced at $499, including the software. For more details or dealer enquiries, contact BIZTeL, (02) 607 0255.

Networks of the future

'IN THE 1990s the network will become the computer, while individual processors will take on specialist processing, com-

munications or file server roles within the network. The network will also be transparent to users who will not want or need to distinguish between the various elements.'

This forecast was made by Dr Anthony West, Director of Marketing and Corporate Strategy for Sun Microsystems Australia, at the CSA Technical Conference which was held in Sydney recently. Twenty CSA systems and software engineers presented papers at the two day conference which celebrated the 20th anniversary of the company's foundation. The conference

Integrated with NetWare security to control access to the console, Remote Console also works with Fresh Technology Group's popular LAN Assist Plus software that allows access to other workstations on the network. The software is compatible with Workstations based on IBM PC, XT, AT and PS/2 machines and compatible, running DOS 2.x or later.

Fresh Technology Group has also announced the release of Fresh Utilities for NetWare. Fresh Utilities are for network administrators and users who use Novell NetWare for local area networking. Network administrators using Fresh Utilities can access and consolidate information from the file server for details about user activity on the network, files users have open and the print queues that are present. Fresh Utilities use file server and Bindery data to generate and print detailed reports about the file server and its use from an easy to use menu interface. The network administrator can also use Fresh Utilities to monitor activity on the file server as it occurs and determine to what extent the file server is being utilised.

Fresh Utilities also include ten command line utilities that allow users and administrators on the network to complete tasks more efficiently than by using NetWare alone. These network shortcuts provide all users with a faster and more productive means to increase NetWare's functionality. Included command line utilities are:

:Ftlogout – after a definable period of keyboard, disk driver or printer inactivity, the user will automatically be logged out.

:Ftmsgrmv – watches for *send* or *broadcast* messages on the workstation and automatically clears them after a specified number of seconds, allowing the workstation to resume processing without interruption.

:Ftlock – automatically or manually blanks the screen and locks the keyboard of inactive workstations. Users are then required to type in their password in order to resume using the workstation.

:Ftlight – displays a file server 'drive light' on the workstation screen that notifies users of the file server disk reads and disk writes.

:Ftdirsiz – informs users about the size of a specific directory and its contents, including subdirectories. This information can then be used to generate reports regarding the amount of space used by the entire directory tree.

:Ftcopy – a faster and more powerful sub-stitute for the ncopy and DOS copy commands, ftcopy allows users to copy a file to the file server so that the DOS and Net-Ware file attributes remain intact.

:Ftbind – displays Bindery object and property information in ASCII and hexadecimal notation for objects such as users, print queues, file servers, and so on. A useful program for supervisors and programmers working with Bindery objects and their properties.

:Ftdrives – reports to users the drive letters not currently used by local drive and NetWare mappings. Ftdrives saves users time by helping them avoid altering their current drive mappings without a search through existing drive mappings to find a free drive letter.

:Ftgroups – displays an on-screen grid showing the names of all the groups on the file server and the members of each group.

:Ftsend – allows message sending within applications.

The Fresh Utilities enables network administrators to generate easy to read reports about the activity of the file server and its users, groups and print queues. Formatted reports can be printed to a file, local printer, or a Netware print queue.

The user interface maintains the Novell look and feel, and on-line help guides users through the information they are looking at.

Fresh Technology has also announced Modem Assist, which provides modem sharing services for Novell and NetBios-compatible LANs. Until recently the only way to share modems on a local area network was with an expensive and often complicated asynchronous communications server. Modem Assist is a complete network modem sharing software package, providing access for up to 20 modems for local area network users. With Modem Assist, users can access any installed modem from any workstation on a LAN. With Modem Assist, a dedicated communications server and the cost of rerouting all modem phone lines is completely eliminated. By sharing fewer modems on the network, increased savings result by purchasing fewer modems, which reduces monthly telephone line expense.

Modem Assist works with multiport serial cards from a variety of manufacturers, which support up to 16 modems on a single workstation. Modem Assist requires less than 10Kb of memory, and runs entirely in the background of any workstation with a modem. The workstation hosting the modem does not have to be dedi-cated and no special hardware is required. Applications can continue to run on the workstation as other users access the modem, and Modem Assist prevents rebooting when the modem is being accessed. Modem Assist works with internal or external modems, at speeds of up to 19,200bps.

Fresh Technology is a communications package which is designed specifically for use with Modem Assist and provides users with: a dialing directory, automatic redialer, session recording, Xmodem file transfer and terminal emulators such as ANSI, DEC VT 100 and VT 52. Modem Assist also works with many existing communications packages, including Procomm Plus network version, Crosstalk Mark IV, and Co/Session Lan.

Modem Assist also works over bridged servers which allows access to any modem on a bridged network segment. On Novell ELS II, a non-dedicated server is set up as a separate network, so Modem Assist's bridging capability allows access to modems on the network from a non-dedicated Novell server.

Modem Assist is provided in both Net-BIOS and IPX/SPX versions. For information on any of the Fresh product range, contact the Australian Distributor, Powertech International, (03) 348 1544.

X.25 data compression

SPECIALIST INTERNETWORKING company, Microcom, has announced the first X.25 data compression product available in Australia. Microcom has also announced a compression product which enables lower capacity communication lines (9600bps) to transfer data up to 2048Kbps capacity.

With the new products, effective transmission rates for companies bridging over X.25 and other leased connections can be increased by a factor of up to 4:1 on digital lines and 2:1 on X.25 lines while significantly cutting transmission costs. The compression options serve as enhancements to the Microcom LAN Bridge (MLB) series, which is distributed in Australia by wide and local area network specialist, Com Tech Communications.

'The new hardware and software options available from Com Tech offer substantial gains in performance and flexibility at little incremental cost,' said Dave Jacobson, Com Tech's Microcom Product Manager.

The compression module serves as an

enhancement to the Microcom MLB/6500 LAN bridge for X.25 connections and it will be well suited to multi-national companies currently relying on private X.25 networks for international traffic. The enhancement compresses the data into fewer packets, increasing throughputs and reducing kilopacket or kilosegment charges. A 100Kbps file normally requiring 1000 packets is reduced to 500 packets through Microcom's compression techniques.

'With the MLB/6500, users can pay by traffic volume rather than paying a fixed monthly cost for expensive private lines. The compression feature aids in positioning X.25 technology and Microcom bridges as a more attractive option to private lines,' Jacobson said. 'Because Microcom based its internetworking products on a modular architecture, the new features extend the value of existing equipment for all customers.'

Using special hardware and software, the new compression enhancement for the MLB/6000 series of bridges from Com Tech features up to a 4:1 increase in data transfer speed up to Megalink data rates.

'Previous generations of compression were software based,' said Jacobson. 'Microprocessors were not powerful enough to support compression for links significantly over 64Kbps. Users now have the option of Megalink-equivalent service at a fraction of the cost.'

For example, on a 512Kbps line users could realise throughputs of 2Mbps with the new enhancement to the MLB/6000 series. The installed base of Microcom LAN Bridge users can easily upgrade to Megalink-equivalent transfer speeds by replacing a single module in any existing MLB/6000 series bridge.

Data compression for the MLB/6500 for X.25 links is available from Com Tech as software priced at $1920 (plus tax) and a hardware interface priced at $3500 (plus tax).

The new module for MLB/6000 bridges includes the complete data compression engine, implements as a custom hardware and software package. The compression interface is priced at $5850 for 4:1 compression and $3500 for 2:1 compression (plus tax) with the MLB software upgrade priced at $1270 (plus tax). Com Tech Communications can be contacted on (02) 317 3088.

Ethernet for the Mac

DAYNA COMMUNICATIONS, Inc., leaders in the Macintosh connectivity field, today announced the appointment of Tri-Data Communications Pty Limited as the exclusive Australian distributor for their Dayna-PORT line of Ethernet adaptors.

DaynaPORT adaptors allow Macintosh users to connect to thick, thin or 10Base-T (twisted-pair) Ethernet systems and share company-wide network services. Dayna-PORT adaptors support the Apple Macintosh II family, SE and SE/30 series and will also be available for the new Macintosh LC and Macintosh IIsi models. A variety of protocols are supported in addition to EtherTalk, including TCP/IP, DECnet, OSI and A/UX.

'Tri-Data Communications' expertise in networking Apple products, makes them the perfect choice as a distributor of our DaynaPORT adaptors,' says Boyd Jones, President and CEO of Dayna Communications, Inc. 'Their reach into the Australian Macintosh market will be highly beneficial to the distribution of our products in that part of the world.'

The complete DaynaPORT range will be sold in Australia for $599 (plus tax). Tri-Data can be contacted on (02) 975 2799.

Bridge Ethernet through T1 and E1

CONNECTING REMOTE Ethernet LANs over T1 and other high-speed data links up to 2.048 MBits/sec will be easier and less expensive, and the resulting network performance significantly higher, with the use of the LANB/200 Remote Ethernet Bridge now available for ADE Network Technology.

The LANB/200 is a self-learning, plug-and-play remote bridge which provides a transparent link between Ethernet LANs using any high-speed synchronous connection, including 1.544Mbps T1, fractional T1 and 2.048Mbps E1 data links.

ADE has optimised the LANB/200's protocols to maximise utilisation of the expanded bandwidths available from T1 and E1 links. For most applications, the throughput of the link LANB/200 is more than 90 per cent of the link speed.

'This increased performance makes it feasible for bandwidth-intensive applications such as graphics or large file transfers to be connected over remote links,' said ADE director Wayne Anderson. 'We can now effectively deliver virtually any LAN application to remote users across high-speed WAN links.'

'Remote users,' said Anderson, 'are un-likely to notice significant performance differences of remote connections over T1 links as compared to running on a purely local Ethernet segment.'

The LANB/200 uses an automatic, self-learning algorithm to build address tables of both local and remote nodes so it can filter data packets for transmission to the appropriate segment of the network. There is no need to preconfigure the LANB/200 or to teach it addresses of the nodes connected to either the local or remote LANs.

Instead, a pair of LANB/200s (one connected to each Ethernet LAN and to each other via T1 or other high speed link) operates transparently to the networks to which they are connected. During operation, each bridge 'learns' about the network's nodes by building internal tables which include the address of nodes of each subnetwork. The pair of remote bridges monitor each of the subnets and forward only those packets addressed to the remote network.

The rapidly decreasing costs of T1 links, the increasing availability of fractional T1 services, and the significantly lower cost of the LANB/200 make it possible to economically configure WAN links to home offices or remote, small business workgroups.

Typical application might include telecommuting users working from their homes, or small remote Novell or TCP/IP work groups with a need to connect to LAN servers at a central location.

The LANB/200 provides its superior performance and ease of use for $5995 compared to $10,000 and higher for other products in the remote Ethernet bridge market. The price includes the LANB/200's self-contained enclosure, RS-499/422 interface and power supply. An optional thin Ethernet interface is available for $440.

A less-expensive version of the LANB/200 which supports speeds of up to 64Kbits/sec is available for $4180.

Anderson said that by early 1991 ADE will offer the LANB/200M, an upgrade to the LANB/200 which will feature such network management features as Spanning Tree Protocol, access control and the collection and reporting of bridge status and statistics.

ADE's product family includes local and remote Ethernet bridges, the EtherMeter TM, and the Network Management Station. Together, these products provide a complete hardware and software solution for constructing, monitoring, and managing LAN subnetworks in a complex internetworking environment.

For more information, contact ADE Network Technology, (03) 543 2677.

Primary electronic
collection points

National – Australian BBS Registry (08) 281 0433

ACT – PCUG Bulletin Board (06) 259 1244

NSW – 2000 & Beyond AliveBBS (02) 544 7123

Vic – Eastwood Systems (03) 870 4623

Qld – The Galaxy GateWay Computer System (07) 207 8900

SA – Oracle PC Network (08) 234 0791

WA – 1990 Multiline (09) 370 3333

Tas – Tassie DataBank (003) 44 9762

BBS Listing 9101

Wed 9 Jan 1991
New systems: 18
Online: 3
Unknown: 2
Temporarily Offline: 3
Permanently Offline: 10
Name Change: 5
Amended: 22
Total Systems: 529

NEW SYSTEMS
NEW SOUTH WALES

AlphaMed Link
Sysop: David More
Phone: (02) 438 2137
Baud: V21 V22 V22bis V23 V32
Access: Reg LVA
Hours: Daily: 0800 – 0400
Computer: Epson AX3/25
DOS: MS DOS
BBSoftware: Maximus

AmiOz BBS
Sysop: Gaza
Phone: (02) 627 4442
Baud: V22bis
Access: Mem LVA
Computer: Amiga 500
DOS: AmigaDOS
BBSoftware: SkyLine

Nightmare BBS
Sysop: Todd Wright
Phone: (02) 545 1132
FidoNet: 3:712/503
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone

DOS: PC DOS
BBSoftware: RemoteAccess

North Sydney PacketGate
Sysop: Graham Broadbridge
Phone: (02) 954 0934
FidoNet: 3:711/907
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM 386 Clone
DOS: MS DOS
BBSoftware: Opus

Nowra BBS
Sysop: Michael Welton
Phone: (044) 23 2460
Baud: V21 V22
Access: Mem Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

OzSys – 1st OzSys BBS
Sysop: Grant Parnell
Phone: (02) 482 2211
Baud: V21 V22 V22bis B103 B21
Access: Mem LVA
Computer: IBM 486 Clone
DOS: MS DOS
BBSoftware: OzSys / SearchLight

Split Personality
Sysop: Steve Dickson
Phone: (066) 86 9588
FidoNet: 3:640/668
Baud: V21 V22 V22bis V23
Access: Public
Computer: Deltacom 386sx
DOS: MS DOS
BBSoftware: RemoteAccess

The Software Works
Sysop: John Young
Phone: (02) 913 7302
Baud: V21 V22 V22bis
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Maximus

The Workbench BBS
Sysop: The Phantom
Phone: (02) 560 9875
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Fri: 1500 – 0000,
Weekends: 1500 – 0000
Computer: Amiga 500
DOS: AmigaDOS
BBSoftware: MetroBBS

Western District BBS
Sysop: Chris Baker
Phone: (063) 53 1329
FidoNet: 3:713/809
Baud: V21 V22 V22bis V23
Access: Mem Reg LVA
Hours: Daily: 2200 – 0800
Computer: Amiga 2500
DOS: AmigaDos
BBSoftware: Paragon

VICTORIA

Alloy BBS
Sysop: Mark Firus

Phone: (03) 560 3902
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: FBBS-PC!

AZCAD BBS
Sysop: Tony Zilles
Phone: (03) 481 6873
Baud: V21 V22 V22bis
Access: Public
Computer: IBM 386 Clone
DOS: MS DOS
BBSoftware: Wildcat!

Total Eclipse BBS
Sysop: Geoff Hansford
Phone: (054) 41 6527
Baud: V21 V22 V22bis
Access: Reg LVA
Computer: Fujitech AT
DOS: MS DOS
BBSoftware: RemoteAccess

QUEENSLAND

Happy Rocks BBS
Sysop: Scott Hamilton
Phone: (079) 78 3477
FidoNet: 3:640/741
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Osiris SE

Micro Magic BBS
Sysop: Josh Adler
Phone: (075) 38 6364
Access: Reg VA
Hours: Daily: 2200 – 0600
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Silicon Data BBS
Sysop: Silicon Data
Phone: (07) 391 6176
FidoNet: 3:640/391
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

WESTERN AUSTRALIA

Millennium Connection
Sysop: Dale Bradbury
Phone: (09) 383 7219
Baud: V21 V22 V22bis V23 B103 B212
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Rainbow BBS
Sysop: Phill Jeffery
Phone: (098) 51 1497
Baud: V21 V22 V22bis V23
Access: Public
BBSoftware: Maximus

UPDATES
AUSTRALIAN CAPITAL
TERRITORY

The Wings of Hermes
Sysop: Berin Lautenbach
Phone: (06) 288 1303
FidoNet: 3:620/248
MultiNET: 9:6969/102
Baud: V21 V22 V22bis V23
Access: Public
Hours: Daily: 2030 – 0730
Computer: OCT 386/33
DOS: MS DOS
BBSoftware: RemoteAccess

NEW SOUTH WALES

AASES BBS Sydney
Sysop: Paul Hamilton
Phone: (02) 427 5303
Baud: V21 V22 V22bis V23
Access: Mem Reg VA
Hours: Daily: 2030 – 0600
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Wildcat!

Aust Amateur Space Engineering Society
Note: Now called AASES BBS Sydney

Commodore Amiga BBS
Status: Permanently Offline

EasyComm BBS
Status: Permanently Offline

Electronic Gazette
Status: Online
Sysop: Jerzy Farynski
Phone: (02) 548 1476
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

GALEN BBS
Sysop: Paul Purvis
Phone: (02) 675 3996
FidoNet: 3:713/609
MultiNET: 9:8935/2
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Imagineering BBS
Status: Unknown

Merlin BBS
Sysop: Robert Fairbrother
Phone: (047) 35 6280
FidoNet: 3:713/305
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: DSS 386/25
DOS: MS DOS
BBSoftware: RemoteAccess

Create your own programs...

Matrix Layout

...without having to learn or use a computer language.
Matrix Layout 2.0 contains everything you'll ever need to build your own programs.

FlowCharts

The first step is to create a diagram of your program by using the *FlowCharts* tool. *Matrix Layout* already has Flowchart blocks built-in. Then there is the choice of hundreds of objects to give you all the functions you'll ever need. You can also add your own specialized objects which can be saved in *Matrix Layout* for later use.

Paint

The second step (if you like) is to use the *Paint* function to add pictures or buttons to your program. *Paint* has a full pallette of graphics tools that enables you to draw an image, which can be placed into your program. You can even scan.

Cards

The third step/or option is *Cards*. This lets you build a database of cards containing either text, graphics or buttons. You can link together various kinds of cards, then use them in your program.

Convert Files

Now that you've created your program the last thing to do is save. *Matrix Layout* will automatically create a ready-to-run .EXE file or create the finished source code in Microsoft C, Turbo C, QuickBasic, Turbo Pascal or Lattice C. ($100 extra for dBASE)
$325 to create your own programs quickly and easily.

Information

For more information on Matrix Layout 2.0, simply send us a copy of this advertisement with your business card attached.

Monitor World BBS
Status: Temporarily Offline
Note: System will re-open in Victoria in the near future

Out of This World BBS
Status: Permanently Offline

SYDTRUG Trug<45>86 BBS
Note: Now called TRUG-86

System-X
Sysop: Scot Art .
Phone: (02) 356 4148
FidoNet: 3:712/634
SIGnet: 28:2100/120
Baud: V22 V22bis
Access: Public
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Technobank
Sysop: Don Cunningham
Phone: (069) 74 1150
FidoNet: 3:713/611
Baud: V21 V22 V22bis
Access: Mem Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

The Croydon Exchange
Sysop: Ali Bacon
Phone: (02) 744 7415
Baud: V21 V22 V22bis V23
Access: Mem Reg VA
Computer: IBM 386 Clone
DOS: OS/2
BBSoftware: RemoteAccess

The Dark Tower BBS
Note: Now called The Croydon Exchange

The Future BBS
Status: Permanently Offline

The Inn of the Last Home
Status: Temporarily Offline
Note: Unavailable until Feb 1991 due to blown up comms card

The OMEN
Status: Permanently Offline

TRUG-86
Sysop: Errol Rosser
Phone: (02) 790 5681
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

VICTORIA

A & C Land
Sysop: Stephen Walsh
Phone: (053) 42 0807
FidoNet: 3:635/531
Baud: V21 V22 V22bis V23 V32 B103 B212
Access: Mem LVA
Computer: Amiga 2000
DOS: AmigaDOS
BBSoftware: Paragon

Advance BBS
Sysop: Lex O'Connor
Phone: (03) 593 1887
FidoNet: 3:636/201
SIGnet: 28:4200/32
Baud: V21 V22 V22bis
Access: Public
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

Bay City BBS
Sysop: Don Grover
Phone: (03) 772 9597
FidoNet: 3:636/211
Baud: V22 V22bis
Access: Public
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Wildcat!

Brainstorm Oz!
Status: Permanently Offline

EUPHORIA BBS
Sysop: AYLA
Phone: (03) 525 5432
Baud: V21 V22 V22bis V23
Access: LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

GW Central
Note: Now Called Alliance BBS

Southern Mail
Sysop: Maurie Halkier
Phone: (03) 725 1621
FidoNet: 3:633/320
SIGnet: 28:4100/2
Baud: V22bis PEP
Access: Mem
Hours: Daily: 1030 – 2300
Computer: Eastcom 386/25
DOS: PC MOS
BBSoftware: Maximus
Note: PEP only from 1 Feb 1991

Telegraph Road
Status: Permanently Offline

The Image
Status: Permanently Offline

The Software Works
Status: Online
Sysop: Simon Gronow
Phone: (03) 589 6315
FidoNet: 3:632/998
SIGnet: 28:4100/10
Baud: V21 V22 V22bis V23 V32 B103 B212
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Warehouse 242
Status: Permanently Offline

QUEENSLAND

Amiga Life Line
Sysop: Mark Robinson
Phone: (07) 824 2210
Baud: V21 V22
Access: Reg LVA

Complete BBS Registry Listing

WE PUBLISH UPDATES – new systems and changes to the status of other systems – for the National BBS Listing every month. The complete listing is available for download from the primary electronic collection points in each state – it is about 600K compressed. If you would like a current complete listing without having to download it, send an IBM-formatted floppy disk to: BBS Listing, *Your Computer*, PO Box 199, Alexandria 2015 NSW. Registration of Bulletin Boards is only accepted electronically at the primary electronic collection points – please address all enquiries through them.

Hours: Daily: 2300 – 1000,
Weekends: 1830 – 2030
Computer: Amiga
DOS: AmigaDOS
BBSoftware: TransAmiga

ENT-MOOT Educational BBS
Sysop: Graham Acworth
Phone: (075) 46 0213
FidoNet: 3:640/662
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Amiga 2000
DOS: AmigaDos
BBSoftware: Paragon

OZ Board
Status: Unknown

SOUTH AUSTRALIA

BIZ-NICE BBS
Sysop: David Wilson
Phone: (08) 269 7029
FidoNet: 3:681/851
Baud: V22 V22bis
Access: Mem LVA
Computer: Oliveti M28
DOS: MS DOS
BBSoftware: RemoteAccess

Concept BBS
Status: Permanently Offline

JC's UnderWater BBS
Sysop: Crispin Harris
Phone: (08) 234 1223
FidoNet: 3:680/813
Baud: V21 V22 V22bis V23
Access: Mem Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: QuickBBS

The MarketPlace!
Note: Now Called BIZ-NICE BBS!

The Realm V
Status: Online
Sysop: Matt Rubinstein
Phone: (08) 374 0462
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: Acorn Archimedes
DOS: RISCOS
BBSoftware: Custom

The Sepulchre BBS

Sysop: Matthew Baker
Phone: (08) 379 2238
FidoNet: 3:680/821
Baud: V21 V22 V22bis
Access: Public
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

WESTERN AUSTRALIA

ACCESS Australia
Sysop: Lindsay Blume
Phone: (09) 350 5681
FidoNet: 3:690/634
SIGnet: 28:3100/1
Baud: V21 V22 V22bis V23 V32 B103 B212
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

flame
Sysop: ACC Murphy
Phone: (09) 386 1455
Baud: V21 V22 V22bis V23
Access: Mem VA
Hours: Weekdays: 0000 – 0830,
Weekends: 1800 – 0000
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Insanity Flight
Status: Temporarily Offline

Lightning BBS
Sysop: Simon Blears
Phone: (09) 344 7199
FidoNet: 3:690/601
Baud: V22 V22bis
Access: Reg LVA
Computer: Compaq 386s
DOS: Compaq DOS
BBSoftware: Maximus

Tau Ceti
Sysop: Stephen Darragh
Phone: (09) 245 1925
FidoNet: 3:690/501
SIGnet: 28:3100/3
Baud: V21 V22 V22bis V23 V32 HST
Access: Public
Computer: IBM 386/25 Clone
DOS: MS DOS
BBSoftware: Maximus □

RELEASE UPDATES

Desktop Machines

Ergo Update

Romdon Pty Ltd
Phn: (02) 960 4050;
Fax: (02) 968 2658
8/16MHz 80286 Macro-A AT
Std. RAM: 1Mb
Max. onboard RAM: 4Mb
Operating system: Dos
Hard drive: 40Mb
Bus: ISA
Floppy drive: 1 x 1.2Mb 5.25-inch
Serial ports: 2
Parallel ports: 1
Front panel reset/power switches: Yes/yes
Half-height devices: 1 internal; 2 external access
Expansion slots: 2 8-bit, 2 16-bit (all free)
Power supply: N/S
Display: VGA
Keyboard: 102 keys
Warranty: 12-months
Price (rrp): $2000

Romdon Pty Ltd
Phn: (02) 960 4050;
Fax: (02) 968 2658
8/16MHz 80286 Minipro-A AT
Std. RAM: 1Mb
Max. onboard RAM: 4Mb
Operating system: Dos
Hard drive: 40Mb
Bus: ISA
Floppy drive: 1 x 3.5-inch
Serial ports: 2
Parallel ports: 1
Front panel reset/power switches: Yes/yes
Half-height devices: 1 internal; 2 external access
Expansion slots: 1 8-bit (free)
Power supply: N/S
Display: VGA
Keyboard: 102 keys
Warranty: 12-months
Price (rrp): $2000

Romdon Pty Ltd
Phn: (02) 960 4050;
Fax: (02) 968 2658
16MHz 80386SX Micro-Tower
Std. RAM: 1Mb
Max. onboard RAM: 8Mb
Operating system: Dos
Hard drive: 28ms 40Mb; 80Mb optional
Bus: ISA
Floppy drive: 1 x 3.5-inch
Serial ports: 2
Parallel ports: 1
Front panel reset/power switches: No/yes
Half-height devices: 1 internal; 2 external access
Expansion slots: 4 16-bit (all free)
Power supply: N/S
Display: VGA
Keyboard: 102 keys
Warranty: 12-months
Price (rrp): $2500

Laptops & Portables

ConnectAbility Update
ConnectAbility Australia
Phn: (03) 793 1655;
Fax: (03) 793 2800
16MHz MLT386SX Notebook
Std. RAM: 1Mb
Max. onboard RAM: 5Mb
Operating system: Dos
Hard drive: 20Mb; 40Mb optional
Bus: ISA
Floppy drive: 1 x 1.2Mb 3.5-inch
Serial ports: 1
Parallel ports: 1
Display: Backlit LCD VGA
Keyboard: 84 keys
Weight: 3.4kg including battery
Power: Mains/battery
Warranty: 12-months
Price (rrp): N/S

Tektronix has released the second-generation of its colour thermal wax printer, the Phaser. The 300dpi printer family is available in a number of configurations from the Phaser II SX, which used the host computer for image processing to the PostScript Phaser II PXN and DXN models which feature Ethernet connectivity.
Phaser II range from $8495 to $19,996; 4Mb memory upgrade $1695. Tektronix (02) 888 7066.

Hewlett Packard has slashed the price of its LaserJet IID from about $7000 to $4310. The dual-bin IID has recently been superseded by the LaserJet IIID.

Teco Update
Teco Australia
Phn: (03) 720 4411;
Fax: (03) 720 5355
8/16MHz 80386SX LT5600 Laptop
Std. RAM: 1Mb
Max. onboard RAM: 4Mb
Operating system: Dos
Hard drive: 40Mb; 100Mb optional
Bus: ISA
Floppy drive: 1 x 3.5-inch internal; 5.25-inch external drive also included
Serial ports: 2
Parallel ports: 1
Other I/O: 16-bit expansion slot
Display: Paper-white, supertwist LCD VGA
Keyboard: 82 keys
Weight: 7kg
Power: Mains/battery
Warranty: 12-months
Price (rrp): $5950

Compatibility: Epson LQ, IBM ProPrinter
Printing method: Drop on demand
Rated noise (working): 50dBa
Ink colours: 4 (separate reservoirs)
Printing colours: 7
Carriage width: 15-inch
Pitch: 10, 12, 18cpi
Resident typefaces: 18
Graphics resolution: 360 x 360
Data buffer: 128Kb
Warranty: 12-months
Price (rrp): $2050

Inkjet Printers

IBM Update

IBM Australia
Phn: (02) 634 9111;
Fax: (02) 680 4285
24-nozzle ExecJect
Rated speed (10cpi): 300 to 600cps Draft; 150 to 300cps NLQ

Paper size: A4, legal, B5
Input/output trays: 200/200 sheets
Resolution: 300 x 300
Resident typefaces: 8
PostScript: Optional
Other emulations: HP Graphics Language (HPGL)
Data buffer: 1Mb
Buffer expandable to: 4Mb
Warranty: 12-months
Price (rrp): $4678; the 5ppm LaserPrinter E is also available, $3158

Laser Printer

IBM Update

IBM Australia
Phn: (02) 634 9111,
Fax: (02) 680 4285
10ppm LaserPrinter
Rated noise (working): 50dBa
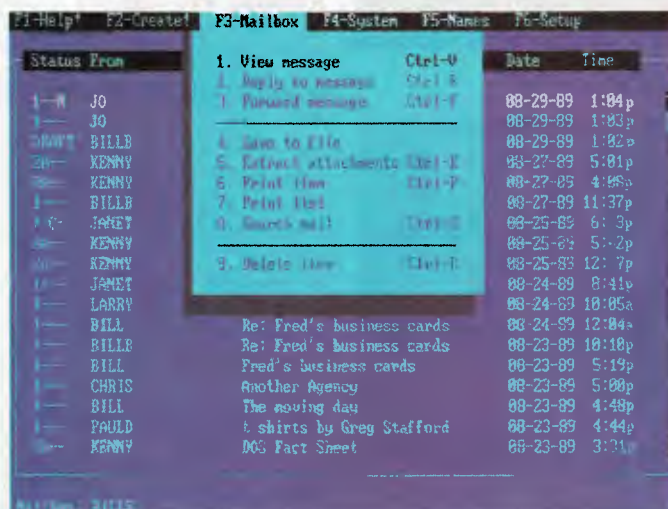*Compatibility:* IBM, HP LaserJet

Broadening the base

Microrim's R:Base relational database package can now directly access and manipulate dBase files. The new release, 3.1, uses a process called Dynamic Data Integration, which allows users to read and write dBase III and III+ files and use and update the dBase indexes – the software cannot use or update dBase IV indexes. Because R:Base treats the dBase indexes as its own, no import procedure or translation is necessary. It also now supports simultaneous access to dBase and R:Base files over a network using Concurrency Control to ensure data integrity. Another major improvement is that memory usage has been reduced from 520Kb to 470Kb and the response speed of the software has been improved, particularly in lookups, sorts and selects. ANSI Level 2 SQL (Structured Query Language) has been fully integrated with now user translations required.
R:Base release 3.1 $1019; upgrade from 3.0 $20 and upgrade from 2.11 $330. PC Extras (02) 319 2155; fax (02) 698 9926.

Email through Windows

Powertech International is now shipping Da Vinci eMail for Windows version 1.8 which supports greater interoperability with other Windows applications and has major refinements to the user interface.

Da Vinci eMail supplements phone and post office communications.

Using Windows' DDE (Dynamic Data Exchange) ability, eMail users can view files attached to messages – when an attachment is 'executed', the appropriate application is loaded. Attachments from non-Windows applications can also be viewed to files from within Windows. Users can record and play voice messages and also view faxes. Other refinements include improved search and retrieve abilities, directory maintenance and attachment extraction. Polaris' Packrat and similar Windows personal information managers can now be searched for address information. A 'while you were out' pad, written in Asymmetrix' Toolbook is now part of the software. The interface now has a row of buttons below the menu bar for access to common functions and a status bar at the bottom of the window displays how many messages are in the mailbox and other information.

Da Vinci eMail 1.8 from $325. Powertech International (03) 348 1544; fax (03) 348 1596.

Free mailing list

Softcode, the distributor of Tracker Five, the top-selling Australian developed client database tracking system, is now offering a 1000-name mailing list free to all new users. Each copy of Tracker will now include an order form from direct marketing information supplier Australian Business Information – purchasers can nominate to have the names sourced from categories in any of the 55 Australian Yellow Page directories which will then be supplied on disk in Tracker's database format. Existing users can have the first 1000-name list for the discounted price of $90; additional lists are $200 each.

Tracker Five $495. Softcode Pty Ltd phone (03) 820 4920; fax (03) 820 3213.

Techway ready to ship

Jeff Ray, Techway's director of manufacturing, with Karl Hessheimer, operations program manager from NCR in Augsburg, Germany, verifying the final safety check on an NCR '486 MCA as part of the final qualification process.

THE TECHWAY/NCR alliance was announced in June 1990, with the process of setting up the production facilities and commencing initial production taking just a few months. The alliance gave Techway access to NCR's personal computer workstation manufacturing techniques and design philosophies. The production process was set up under the supervision of NCR staff from their Augsburg plant in Germany, and senior NCR management including the Operations Program Manager, NCR Augsburg, Karl Hessheimer, carried out the verification tests on the workstation range to be produced in Australia. Techway had to pass the demanding NCR Manufacturing Verification Test (MVT) which included a 24 hour run-in and a 48-hour reliability test running diagnostics to fully test each and every one of the systems produced for MVT.

Techway produced 40 units for NCR's assessment process, to verify that Techway is capable of meeting the stringent standards for Total; Quality Management. The pass mark is 99.8 per cent, virtually a zero failure rate.

Jeff Ray, Techway director of marketing, said that the company had built an initial 40 units as part of a pre-qualification training program. 'The forty units have been through assembly, functional tests, inspection, run-in and extended run-in, and we have had no failures during this reliability testing,' he said. 'Each of these units has been run for a minimum of 72 hours, with diagnostic software running. At the end of this time, each machine's data-logger is downloaded to provide a report of the diagnostics. While we have had one or two very minor problems, we are confident we will pass the verification tests with flying colours.'

Techway is building several NCR systems. These include '386SX 16MHz units with Industry Standard Architecture (ISA), '386SX 20MHz (ISA), '386SX 20MHz (MCA), and '486 25MHz (MCA)

Techway is accredited to meet all major world standards. Techway having been inspected by the Underwriters Laboratory (UL) designate from Standards Australia, and by the Canadian Standards Association (CSA). Techway began shipping products with NCR logos in January, products with Techway logos should be shipping as you read this.

Prices had not been finalised at press time. For more information contact Techway on (047) 316 5333.

– John Hepworth

Capture and convert graphics

Software Express is now shipping version 2.0 of HiJaak, a graphics file converter and screen capture utility. There is a new user-configurable Resident Process Manager and memory overhead has been reduced to 5Kb. An entire screen or only portions of it can be saved directly to the specified format; images can be edited and converted to other formats later. Scaling, colour mapping and image processing features can be applied at capture or afterward to the saved file. The Capture program now allows popping-up in any mode with one set of hotkeys, even on the previously troublesome Hercules card. A separate Windows applications program is in this new version. HiJaak can also be used to merge graphics and text files.

Hijaak $245. Software Express (03) 663 6580; fax (03) 663 6117.

Read all about it!

Pactronics now carries the full range of Abacus computer titles of C-64s, Amigas, Amstrads, Ataris and DOS-based PCs. Amiga titles include: *Amiga for Beginners* which explains in great detail for new users about such topics as CLI and Basic ($39.95); *Amiga Basic Inside and Out* is a detailed tutorial on Basic commands with numerous examples ($49.95 – a supplementary disk is also available for $19.95); and *Amiga 3-D Graphic Programming in Basic* details the techniques and algorithms used in generating three-dimensional graphics ($49.95, supplementary disk $19.95); and *Amiga Tips and Tricks* which covers the more complex Basic functions ($49.95, supplementary disk $19.95). DOS titles include: *PC Files and Format Conversion* which gives a detailed description of all major file formats

and explains how to swap data between programs ($49.95, supplementary disk $19.95); *MS-DOS Tips and Tricks* which covers the use of pipes, filters, batch files and different types of devices ($49.95); and *Turbo Pascal Internals* which details dozens of topics such as writing Terminate and Stay Resident programs, window and menu systems, how to handle expanded and extended memory, multitasking operations and using interrupt ($89.95 including 2 disks with 800Kb of example programs).

Contact Pactronics for the name of your nearest dealer: (02) 748 4700; fax (02) 748 4604.

Unix catalogue

RJM Open Systems are now selling Interactive System's catalogue of some 450 Unix/386 applications – the book lists hardware and software products that are compatible with Interactive's Unix System V release 3.2 and most other Unix systems for '386 and '486 systems. The catalogue, which weighs over 1.5kg, is organised by categories such as networking, accounting, office automation, databases and development tools. A separate guide to X11 graphics applications will be available shortly.

Unix Software Catalogue $15. RJM Open Systems (02) 878 5033; fax (02) 878 5473.

Personnel software

Idealogy has released version 5.0 of Pro-Found, a personnel file management system. Aimed at personnel and employment consultants, the package maintains a fully integrated database on candidates, clients, assignments and referrals using a mouse-driven, windowing interface. The system can support from 1 to 100 users and can be tailored to specific needs. Optional modules include billing, debtors, payroll and general ledger.

Prices vary with specifications. Idealogy (03) 547 0477; fax (03) 558 5035.

Big screen for a PC

Sharp Corporation has released the QA-75 Projection Panel for IBM-compatibles, Macintosh and Apple II computers. The units have a 23-key infrared remote control and are compatible with all relevant screen graphics standards. The triple super-twist LCD screen offers 16 levels of shading and hatching and has a resolution of 640 by 480 with a 1:1 aspect ratio. Other features are an on-screen pointer and screen freeze and enlargement. A carry case is optional.

QA-75 Projection Panel $2495. Sharp Corporation (02) 831 9111; fax (02) 831 1608.

'386SX upgrades

Local enhancement board builder Hypertec has added two new 80386SX upgrade boards to its range for upgrading '286 machines. The credit-card sized Hyper 386SXs fit directly into the processor slot and are now available in four
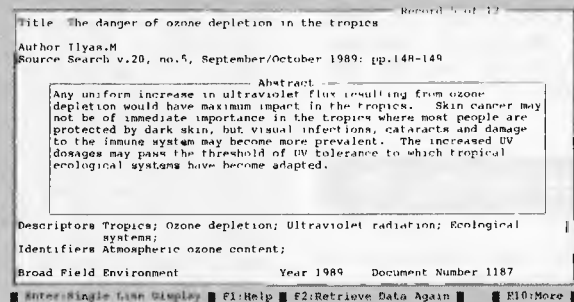
CSIRO CD

SAGE (SCIENCE AND Geography Education) is a new CD-ROM produced by the CSIRO using software supplied by Space-Time Research. It is a menu-driven bibliographic data base indexing popular Australian science, geography and environmental journals. The details it gives include author, title, journal volume, and date of publication. This makes SAGE more appropriate for libraries, schools and colleges that hold the journals indexed rather than the home environment.

Issue 1 of the CD only contains 1400 records. There will be two issues per year with Issue 2 expected to hold more than 2000 items. Generally, entries for letters and also articles less than a quarter of a page are not included. However, exceptions are made for highly relevant material. Some journals are indexed as far back as 1986, others only from 1989.

Searching can be carried out by author name, date of publication, journal title, descriptor or identifier. Descriptor is really just another term for 'subject heading' while Identifiers are generally geographic locations or specific names. Truncation searching is possible through the 'starts approximately' function while the 'contains approximately' function is useful in locating like sounding words such as 'hair' and 'hare', 'gregory' and 'gregorie'.) Boolean search operators are available to refine searches while it is important to note that, by default, each successive search is automatically combined with previous searches to provide a result. The AND, OR and NOT operators have to be represented in searches by the ampersand, pipe and tilde characters respectively – this is a clumsy way of searching and one wonders why the system was not designed with the operators retained as reserved terms and able to be keyed in directly.

You may choose to display your search results either directly from the main menu or by hitting a function key at the search/enquiry screen. This product does nothing to improve the poor response time reputation of CD-ROM systems in general. It took Sage 13 seconds to retrieve 12 records for display.

```
Title  The danger of ozone depletion in the tropics          Record 1 of 12

Author Ilyas.M
Source Search v.20, no.5, September/October 1989: pp.148-149

                            Abstract
  Any uniform increase in ultraviolet flux resulting from ozone
  depletion would have maximum impact in the tropics.  Skin cancer may
  not be of immediate importance in the tropics where most people are
  protected by dark skin, but visual infections, cataracts and damage
  to the immune system may become more prevalent.  The increased UV
  dosages may pass the threshold of UV tolerance to which tropical
  ecological systems have become adapted.


Descriptors Tropics; Ozone depletion; Ultraviolet radiation; Ecological
            systems;
Identifiers Atmospheric ozone content;

Broad Field Environment           Year 1989     Document Number 1187

  Enter:Single Line Display   F1:Help   F2:Retrieve Data Again     F10:More
```

If full record print-outs are required, the print command must be keyed while a full record display is being viewed. Conversely, if multi-line printouts are initiated at the multi-line display. The whole print output facility of Sage is unwieldy and time-consuming. Frequently I found I had initiated printing full records of items I did not want. Accurately printing search results involves the laborious tagging/untagging process and accessing the right display screen.

The print display set up is extensive with the capability to include bold-face, underlining and colour. These options may be entered during an actual search rather than at the initial set-up stage. Search results may be converted into dBase III or WordPerfect record format.

CSIRO makes no bones about the fact some work is needed on the software but, as they point out, they have delivered a cheap, useful package that has a place in Australia's computing community.

Sage subscription $100 per annum. For more information contact Lea Giles-Peters, Manager CSIRO Australia, PO Box 89 East Melbourne Vic 3002; (03) 418 7333; fax (03) 419 0459.
– Martyn Brown

Environment-proof PCs

DUST, WATER AND temperature extremes don't mix well with computers and peripherals. Sancom Computers has designed and is now manufacturing locally the EP8000 range of computers and peripherals that are fully sealed against dust and water and are mounted in a shock-absorbing sub-chassis. All metal is RF shielded and a mains suppression filter, input voltage clamped varistor and output voltage suppressor are included. Temperature is controlled with a solid state conditioning unit. The EP8000s can be configured as desktop or tower units, or rack-mounted. The base model in the range is a 16MHz 80286-based PC with a single 5.25-inch high-density FDD, 42Mb HDD, 1Mb of RAM and Super-VGA monitor with a membrane protected keyboard with five free expansion slots; 80486, '386 and '386SX models are also available. A streaming tape back up unit, RS422 interface and hard disk sizes up to 600Mb are optional.

EP8000 prices vary with configuration. Sancom Pty Ltd (02) 742 5188; fax (02) 642 0228.

different socket configurations: PLCC I (for PS/2 Model 50z, Epson AX2E, Samtron 286s, Mica 286 Tower and various NCR models), PLCC II (for PS/2 Model 30-286 and Memorex Telix 7025-12), PGA (for IBM AT and PS/2 Models 50 and 60), and Tower (for Compaq Deskpro 206 and some models of the NEC PowerMate).

Hyper 386SX (all configurations) $595. Hypertec (02) 816 1211.

Games

Cartooners

CARTOONERS IS AN excellent program for kids which allows them to create their own movies on the computer. It's very well presented, in a format that is simple enough to hold any youngster's attention for quite a while. It is a good program in that the children can do whatever they like, without it being wrong, and they can move at their own pace, which is also beneficial. The choices are there to be made and these are totally up to the imagination.

The program features animated graphics, a simple interface, and many scenes and characters to choose from. There are ten background scenes, including a farmyard and a spooky forest, and there are over 40 actors, including a dancing cat, a sly weasel, a black crow, and a rabbit. These characters can be made to talk by use of text balloons which follow the characters around the screen.

There are three levels of the game. The first is a basic Look level which allows various cartoons to only be viewed, including cartoons that you have created. This allows even the youngest children to enjoy the program. The Play level shows cartoons which can then be altered by the kids. The Create level starts off with a blank screen, and the cartoon can be made entirely from the kid's imagination, giving hours of entertainment.

Cartooners is a mouse-driven program, so a mouse is essential for running the game. However, even if Cartooners is an educational program for children, adults will have lots of fun with this one as well.

Cartooners from Electronic Arts $69.95.

King's Quest 5

SIERRA HAVE surpassed themselves this time. King's Quest players will be pleased to note that number 5 heralds King Graham's triumphant return to adventuring. This time it is the magical disappearance of the Royal Castle that has Graham donning his adventuring hat and setting off into the wilderness. King's Quest 5 has got brilliant 256 colour graphics (VGA only), and has been made easier by the introduction of an icon control system.

The icon controls include a separate 'travelling' mode, as opposed to the normal 'walk' mode. The travel mode allows the character to be moved completely through a screen, by walking and avoiding all obstacles in its path, whereas the normal walk option will stop when an obstacle is encountered. The 'look' option is well done also – it will 'see' most objects, and put a quick description of the object or person on the screen.

The 'action' option allows the character to do things without the usual tedious typing and saves the frustration of wondering if you can't do that particular function, or if you have simply got the wording wrong. The 'talk' function is equally as good. The 'control' icon enables the player to adjust the volume of the sound, the overall speed of the game, and the level of detail on the screen during the game. This particular control makes changing these options very easy.

King's Quest 5 returns to the use of magic to help in the quest. King Graham is presented with a magic wand by a kind magician at the beginning of the game allowing the player to overcome seemingly insurmountable obstacles by its use.

Brilliant graphics and extra features make this the best adventure program in the series. There's many good knights entertainment here!

King's Quest 5 from Sierra $89.95.

Midwinter

MIDWINTER IS A powerful and challenging mixture of arcade and strategy games, original in concept and revolutionary in design. It is set in the next ice-age, on an island that is the last habitable land on earth. The crux of the story is that an evil enemy is attempting to destroy you and your fellow pioneers and rule the earth. Your task is to seek out allies and equipment to help overcome the evil Russian.

This is a complex game which took me days to figure out, but it is well worth the trouble. Midwinter is superbly thought out and programmed.

The graphics on VGA are quite spectacular, and they include fractal generated, fully light sourced terrain. The area that you have to defend is roughly 160,000 square miles, and the game is programmed so that geographical accuracy is almost perfect. You can control up to 32 characters, with each character having 14 personal attributes that must be taken into account when they are being moved about the island. There are four modes of transport, each one almost being an arcade game in itself.

The skiing mode is quite challenging, with control of speed being an important factor in arriving to your destination safely. Snow-mobiles are available, but must first be found. They are the fastest way to travel but they can be very difficult to control. Hang-gliders, likewise, must be found, and are extremely difficult to control, but this is easily the most visually stunning of the four modes of transport. Travel by cable car is the last mode available to the characters, and is very easy to do, by virtue of the fact that all you have to do is sit there and you can travel quite large distances over difficult terrain quite easily.

Midwinter is icon driven, and the program may be run with the keyboard, a joystick, or a mouse. This makes consulting maps and changing strategies a lot easier on the player. The maps of the island are quite detailed, and having stunning colours showing altitudes on VGA. The map may be zoomed in to show more detail of the area, and an arrow always marks the position of the character you are controlling.

Midwinter is a difficult game, but once you get the hang of it, it's even more difficult to stop playing. The stunning visuals and wealth of action will keep anybody interested.

Midwinter from Rainbird $89.95.

Test Drive III

TEST DRIVE III is in my opinion the best driving simulator on the market. It breaks free from the existing Test Drive series in many areas which were very restricting to the game, making it much more playable and enjoyable, like the selectable stations on the car radio. Windshield wipers are a necessary part of the game as you can run into bad weather at any time which adds a new twist to the game.

There are nine difficulty levels available, ranging from the basic levels, which are still reasonably difficult, to level nine which is for experienced Test Drivers only. The amount of difficulty encountered

DOS POS

Leda Business Equipment has released a range of packages to provide both standalone and networked Point of Sale (POS) systems for DOS PCs and Sharp ER3100 and ER2910 cash registers. The Ideal Retailer packages are for standalone applications and can cater for up to 32,000 stock lines, with debtor control available as an option. A cash register style interface provides a straightforward method for entering sales, and programming and reporting options are menu-driven. The Ideal Retailer Network packages allow multiple terminals and/or cash registers to be linked to a central PC.

Ideal Retailer/Retail Network from $500 to $1800. Leda Business Equipment (07) 252 5318; fax (07) 252 5361.

Stock what you sell

Sigma Retail, a division of Sigma Data, has released dPOSit, a new point-of-sale (POS) and retail management system specifically tailored for

for all

Cartooners (above); King's Quest (below).

Midwinter (above); Test Drive III (below).

by the driver can be modified during the game. For example, the windshield view can be reduced in size, the headlights can be turned off during the night, making driving fairly difficult, and the rear vision mirror can be turned off also, making it impossible to see the opposition, or the police cars which are giving chase.

By far the best features of the game are the instant replay feature, where you can replay your spectacular accidents, and watch them from whichever angle you like, and the ability to drive off the road without the certainty that you are either going to collide heavily with a cliff face or plunge into the ocean.

The car choices are much better, with the cars being purely performance cars, and all three are totally new to the Test Drive series. You can choose from a Chevrolet CERV III, a Pininfarina Mythos or a Lamborghini Diablo. The game reflects the differing performances of each of the vehicles and each choice of cars adds a new dimension.

The graphics are excellent on VGA, with many screens being digitised, including the entire cockpit of the car. New hazards on the road include cross traffic, level crossings and trains, and wandering cows which stray out onto the road and cause havoc.

All in all, Test Drive III surpasses its predecessors, and all other road racing simulators on the market.

Test Drive III from Accolade Software $79.95

– Gregor Stronach

Review copies supplied by Hypec Electronics, (02) 808 3666.

multi-store operations. The system incorporates POS, back-office and front-office functionality, including sales transactions, stock control, debtors and purchase orders. It can be integrated with an existing accounting system. Written in the Magic 4GL (also distributed by Sigma Data), the software can be quickly configured to any of four levels of customisation: parameter modification, import/export capabilities (used to consolidate reports), add industry-specific modules, and module customisation for specific businesses. dPOSit supports product, department and store codes and all codes can be sorted on any digit in the code. Full transaction histories are recorded with up to ten methods of payment allowed – multiple methods of payment are allowed for single transactions. The system also includes returns authorisation, hold transactions, price and product look-up, inter-store messaging and lay-bys and other special sale types.

dPOSit pricing depends on configuration. Sigma Data (02) 957 3777; fax (02) 957 2013. □

Computing on a budget?

Budgetware is Australia's largest distributor of Shareware software. We have hundreds of great titles available for your evaluation selected from the thousands of shareware and public domain programs which have passed through our office for evaluation by our librarians. Below is just a small list of our latest releases. For your own FREE CATALOGUE of all our available software just call or write to us and we will gladly send you a copy. There are no membership fees to pay, or minimum purchases. All our software is quality Shareware and public domain software. Shareware is a great new scheme which allows you to fully evaluate software on your system before deciding whether to pay the full price. Not only is this reasonable but the shareware registration fees are usually far less than the commercial equivalents, and the money goes directly to the author of the program, and not to some huge marketing conglomeration. The beauty of Shareware is that your registrations and comments go directly to the author, and who knows more about the program than the person who wrote it. We strongly urge you to register your programs directly with the authors. If you have any problems in doing this please contact our registration support department who will make every effort to aid you in registering the program with the author. We do not charge the authors a fee to carry their programs, or to allow people to register their programs. We believe that the shareware authors should be supported fully and will make every effort to make registering shareware programs easier and fairer for all involved.

All our software is designed to run on IBM and compatible computers. A minimum of 256K RAM is required although we recommend atleast 512K of RAM for most programs, especially business applications. We charge a flat fee of $12 for 5 1/4 inch disks, and $18 for 3 1/2 inch disks, and for every three disk you pay for you are entitled to a fourth disk of your choice FREE. Payment for orders can be made by cheque, money order, Bankcard, Mastercard, and Visacard. Credit card orders can be taken by phone and fax as well as by mail. Postage and handling is FREE on all orders. You can mail your order to

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PC1027 THESAUR PLUS: Memory resident thesaurus. Program allows you to seek a synonym for any word within almost any application at the press of a button.

PC1046 LEARN A FORM: Program allows you to easily fill in pre printed forms using your PC and a standard printer. You train your computer to learn each form and store the image on disk. you then produce a data file with the information required to fill in the form, and the program does the rest.

PC1255 PHONE PRO: Excellent personal address book manager. You can access information quickly using the optimised search functions, and the program will even dial the number if used with a Hayes compatible modem.

PC1273 VIDEO LIBRARIAN: Fast, easy to learn database manager that will help you to organise and keep track of your video library. Quickly search for titles, stars, etc. and print detailed reports. The program will even print labels for your video cassettes.

PC1612 ACCOUNTING-101: Easy to use accounting package for small business and home use. Allows you to keep track of cheques, deposits, accounts payable, and provides income statements and balance sheets.

PC1648 PC BILLING: Invoicing system for small business use. Prints invoices on standard continuous feed paper. Using a simple data entry screen you can enter billing information quickly and efficiently. The program will keep track of payments and overdues, and provide a number of reports.

PC1727 EASY QUOTE: Price quoting program suitable for use in businesses with a single unit price for items. Two overhead factors are provided for. Printed quotes can also be used as billing invoices. Requires 512K RAM.

PC1742 CASH REGISTER & INVENTORY: Point of sale inventory system for retailers. You enter the relevant company and inventory information. When you enter a sale the program provides the relevant information and updates the inventory and sale records. A number of reports are available including stock lists, sales reports, customer details and more. Requires Hard Disk.

PC1762 STOCK PORTFOLIO: Program stores, manipulates, and prints records needed to manage a portfolio of stocks. A variety of useful reports can be produced.

PC1804 RESUME SHOP: Great resume creation tool. Menu driven package allows you to fine tune your resume by selecting areas to include. A number of sample files are also provided.

PC1854 RENTALS: Fast and friendly rental management system that requires no formal accounting knowledge. Reports available include property reports, general journal, and general ledger. Requires 512K RAM.

PC1878 MEMTOOL: Memory resident desktop utility which provides a calculator, a calendar and appointment scheduler, a file editor with facilities such as search and replace, a DOS guide, a facility to search for a file or group of files, a phone directory, an alarm clock, an ASCII table, a pop up ruler, and a screen capture utility.

Call Budgetware

PC2017 JAPANESE GO: Program based on the popular Japanese board game GO. Similar to checkers in many respects this game requires strategy and clear thinking to play. Comprehensive documentation is included on how to play the game.

PC2059 PROTON WARRIORS: Arcade style battle simulation, set in a maze type playfield using hand phaser weapons. Good graphics and sound effects make for great fun.

PC2071 DR SLEEPTITE: Graphics game where you as Restless Ralph Runabout must stop the evil Dr Sleeptite from producing his evil nightmare capsules at his nightmare factory.

PC2073 RACE!: Miniature car racing game. The cars can accelerate, decelerate, or turn through the race course whilst avoiding the various obstacles. You can use one of the tracks provided, or produce your own customised track.

PC2129 ALICE IN WONDERLAND: Adventure game based on the Lewis Carroll novel. You must find your way through Wonderland whilst examining its contents.

PC2131 LOST ADVENTURES OF KROZ: Great sequel to Kingdom of Kroz. Action packed adventure game has 75 levels with animation, gravity wells, and many more dangers to withstand before finding the sacred Tome of Kroz.

PC2312 STARLORD: Interesting space trading game. You must travel through the universe on your star ship seeking goods to trade, whilst avoiding the aliens.

PC2611 EGA MAH JONG: Based on the ancient Chinese tile game this great graphic game provides hours of entertainment and brain stimulation. Requires EGA/VGA graphics.

PC2720 VGA ROBOTS FROM HELL: Arcade action game utilising high resolution VGA graphics to great effect. Avoid the evil robots whilst attempting to save the planet. Requires VGA graphics.

PC3073 ZIP FILE TRANSFER: Tiny fast utility to transfer files between two PCs at speeds up to 14K per second. Allows you to view directories on both machines, and select files to transfer.

PC3114 WYNDSHELL MENU SYSTEM: Menu program allows you to create easy to use menus to run your applications. Also includes utility to allow you to perform common DOS tasks quickly and easily.

PC3177 BACPLUS BACKUP UTILITY: Menu driven backup utility. Prompts user at every step for ease of use. Handles files of all sizes, and formats disks as they are needed.

PC3179 AUTOSAVE: Memory resident utility that automatically saves your work as you go. The program is flexible as you configure it for your relevant application.

PC3223 CON FORMAT: Memory resident utility you can pop up over any application and use to format a disk without having to return to DOS.

PC3403 PCP PRINTER CONTROL: Memory resident printer control program. Allows you to easily send printer commands from within any application.

PC3416 LUM SIDEWAYS PRINT UTILITY: Memory resident pop up sideways printing utility for use with spreadsheets and text. Supports reverse highlighting, superscript, subscript, and up to eight types of underlining and overstrikings as well as extended ASCII on an EPSON compatible printer.

PC5402 PRINTER PARTNER: Excellent shareware clone of PrintMaster and PrintShop. This program will allow you to produce banners, signs, and calendars for any event. Graphics and fancy fonts can be used to great effect, and most dot matrix printers are supported. Includes utility to convert PrintMaster graphics for use with the program.

PC5303 GRAPHICS WORKSHOP: Program allows you to convert graphics files between formats. Formats include MACPAINT, PCX, GEM/IMG, GIF, TIFF, amd EPS files. You can view files on screen, or print to a laser printer.

PC7304 FAMILY TIES: Genealogy program recommended by the MORMON church for use in keeping track of family records. Wide range of reports and easy data entry make this a great program.

PC8012 BRANDON'S LUNCHBOX: Series of educational games for 3 to 7 year olds. Designed to aid in letter identification, memory development, counting, problem solving, and basic addition.

PC8028 WORD GALLERY: Educational program designed to help children associate the printed word with the object it describes, by providing a series of colourful word object flashcards. Suitable for ages 4 to 7.

PC8083 FLAGS OF THE WORLD: Educational program for all ages. Allows you to view on screen the National flags of all 170 independent nations of the world, plus more. Also you can access information about the country.

PC9317 SILICON SKY: Program turns your PC into a planisphere. Provides a realistic representation of the celestial sphere from any place on earth, at any time.

THE 486 CPU:
ON A HIGH-PERFORMANCE VECTOR

Intel's i486 isn't just a faster '386 – it integrates the cache units and maths coprocessor as part of the chip, greatly improving system performance on high-end applications.

WHEN CHARLES Lindbergh made the first solo flight across the Atlantic, there must have been a doubter or two. 'Why would anyone want to fly across the ocean in an uncomfortable little aircraft when he could enjoy a few days of rest onboard an ocean liner?' one can hear them ask. 'What's the use of getting there faster when the risks are so high and the comfort spartan?'

The answer came later: more powerful engines for aviation, advances in aeronau-

tical engineering and, eventually, reliable passenger planes combining speed with comfort. An adventurer's quest for higher performance ultimately brought on both the space ages, as well as more performance to the general public – with additional features, such as ease of use and lower cost. Sounds like desktop computing.

In a US *PC Week* article published last year, James Martin peered at future trends in computing hardware. He identified three that have long had the stature of in-

dustry commandments: 'faster, smaller and cheaper'. Taking note of the enlarged computing power available through increasingly integrated microprocessors and other components, he also identified a list of improvements that users could expect to see in desktop machines during the '90s. At the head of the list were 'much higher computing power on the desktop; continuing improvement in ease of use; and multi-function PCs (including automatic networking)'.

The first item on Martin's list is a

prerequisite for the other two. Software can bring automatic networking and easy-to-use graphical interfaces to desktop systems. But software needs high-performance hardware, especially microprocessors, to supply these applications with raw computing environments for the 'power office'; high-powered 'managerial' PCs, applications servers in client-server networks, multi-user systems, and multiprocessing systems. The 486, the most powerful member of Intel's 386 microprocessor family, already serves as the CPU in each of these types of systems.

What integration buys

THE 486 IS completely compatible with the 386 DX and SX processors. That means it runs all the software written for the 386 microprocessor line.

However, performance is the main reason to buy a desktop system based on the 486 CPU, because the 486 buys more of it with the currency of high integration.

By bringing two important units onto the chip, units that were previously separate, the CPU saves time that would otherwise be lost during I/O between the CPU and these units. With the math coprocessor and cache units as part of the chip, the 486 CPU has all of the advantages of the 32-bit 386 DX and SX processors.

Racking up the cache

THE 486'S 8KB cache unit speeds the operation of the microprocessor by facilitating the transfer of data and instruction or datum – which will be close by if not adjacent to the code currently in execution.

Bringing code blocks from main memory into a memory cache of static RAM (SRAM) speeds up the CPU so that it doesn't have to access the relatively slow dynamic RAM (DRAM) based main memory. Static RAM has access times of 10 to 40 nanoseconds (ns) while DRAM access times are typically 80 to 200ns.

With a cache on board the 486, how can cache technology continue to deliver increased performance to future CPUs? One option is the 'second-level cache'. The 486 Turbocache is a plug-in module consisting of 64- or 128Kb of additional cache memory plus controller circuitry. It provides a performance gain of as high as 15 per cent, depending on the application and memory system design – see Figure 1.

Modules: the next step

THE STEP BEYOND this in cache technology, called module technology, is a

giant leap for CPU performance. Within the industry, designers have already begun to design modules for very high-speed processors that will solve some of the design problems created by these performance levels.

An adventurer's quest for higher performance ultimately brought on both the space ages, as well as more performance to the general public.

The 486's highest speed at present is 33MHz (megahertz, or million cycles per second). Soon we will see faster microprocessors (50MHz and greater) appearing on the market, and design engineers will face problems synchronising the CPU with other components on the desktop's motherboard. Interprocessor communications slow down because the rest of the system is trying to keep up with the CPU. Also at these speeds, phenomena such as inductance and capacitance (induced electrical currents and charge build ups) interfere with the normal operation of the system's components. Module technology helps deliver solutions to these problems.

There are two levels of module tech-

Figure 1. The SPEC (System Performance Evaluation Cooperative) suite of benchmarks, includes real-life, application-oriented programs that perform a variety of tasks. The programs that make up the suite are divided into two categories: integer-intensive and floating point intensive. The former represents an instruction mix typical of the majority of commercial-oriented application software.

nology: multi-package and multi-chip modules. A multi-package module (MPM) might include a processor and SRAM memory components housing a single module. In a microprocessor multi-chip module (MCM), the CPU, SRAM memory and control circuitry might be mounted directly on a silicon substrate to create a single, compact, high-speed unit. With the help of the on-module SRAM cache, the CPU can keep itself busy even at speeds of above 50MHz.

MPMs and MCMs can also be tested and certified to operate properly at the rated speed of the high-performance CPU – speeds that, within 10 years, will be as high as 250MHz. This year, customers will be able to obtain products based on module technology to drive up system performance and solve the design issues posed by new CPUs.

The MIPS to come

THE FIRST new CPUs to appear this year will be a 50MHz version of the 486 processor. It will not be the last high-performance version, either. The 32-bit 386 architecture (the 386 and 486 CPUs and beyond) does not have a performance ceiling. Future versions of the 486, as well as its successors in the 386 CPU family will continue to raise the performance ante through sub-micron process technology, and design techniques that include superscalar and reduced-instruction set methods. Some microprocessor products will be fabricated using BiCMOS process technology. All these CPUs will remain compatible with the US$30 billion MS-DOS, OS/2 and UNIX software base.

The architecture has a tremendous software momentum. Many 32-bit MS-DOS and Windows applications exist now, and many more are under development. The 32-bit OS/2 Version 2.0 is coming. UNIX System V Release 4 unifies several flavours of the UNIX applications. More than 4000 UNIX applications are already available for the 386. In addition, Intel's own Software Focus Group, as well as several independent software firms, are working

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to provide compilers optimised for the 386 CPU family.

At the systems architecture level, multiprocessing systems compound the 486's performance advantages. In a multiprocessing system, each processor runs a separate application.

The subject of multiprocessing is too big to adequately address in this space. However, multiprocessing systems are already a reality. Compaq's introduction of the dual-processor Systempro (two 386 DX or 486 CPUs). AT&T, Advance Logic research, Corollary, Tricord and Venus all offer multiprocessing systems based on the 486.

Multiprocessing systems are at the top of the performance design pyramid. At its base are high-performance processors like the 486 module technology and optimised compilers. In between lie the single-processor systems constructed on these building blocks. These are the systems that are bringing price/performance and the power to run increasingly sophisticated user interfaces, networking applications and mainframe software to the desktop.

All of these technologies are pit stops along Intel's Micro 2000 road map. The goal of this program is to bring more functions, such as multimedia and intelligent software, and more computing power to a range of systems, from the laptop to the network server. Intel will do this with the Intel 386 architecture, while maintaining compatibility all along the way. The Micro 2000 device will be a 50- to 100-million transistor CPU with several onboard processors. It will be capable of two billion instructions per second, and still be compatible with the 386 processor. Why build it? Why did Lindbergh cross the Atlantic in a single-engine airplane?

High-performance design

THE AGGREGATE performance of a system with Intel's 486 processor depends on numerous factors other than the CPU. These include, but are not limited to, memory, disk and video subsystem design on the hardware side; and compiler efficiency, operating system characteristics and program algorithms on the software side.

Time is the measure of computer performance. The time to complete a specific task is referred to as elapsed time. It includes disk accesses, memory accesses, input/output activities and operating systems overhead, as well as the time spent in executing program instructions: *Elapsed*

time = CPU time + time spent waiting for I/O or running other programs. For maximum and overall performance (minimum elapsed time), system hardware should be implemented to minimise the time spent waiting for I/O.

A number of units form the system architecture, and the slowest of these determines the upper bound on overall performance. These units include the CPU, cache memory, main memory, memory I/O bus, I/O controller and I/O devices.

The operating system, compiler and the type of application software also affect performance. For example, 16-bit applications are developed.

With a cache on board the 486 CPU, how can cache technology continue to deliver increased performance to future CPUs?

Benchmarks

THE MANY STANDARD benchmarks used to evaluate system performance can be divided into three groups:

1. Real-life, application-oriented benchmarks;

2. Kernels; and

3. Synthetic benchmarks.

All of the above can be CPU – and memory – intensive, I/O intensive, or both. Real-life, application-oriented benchmarks include programs which are used by the public to carry out certain tasks – see Figure 1.

In Table 1, kernels such as the Linpack benchmark are pieces of real programs that are used to isolate the performance of a machine's individual features. Linpack is a floating-point intensive benchmark that evaluates performance under scientific and technical workloads. Synthetic benchmarks like the popular Dhrystone program attempt to artificially generate code that resembles a common instruction mix. The Dhrystone benchmark instruction mix is typical of those found in commercial applications. Other synthetic benchmarks include tests performed by publications such as the US-based *PC Magazine*. The results from such tests usu-

EACH NEW GENERATION of microprocessor grows in power. Inevitably, it also falls in price, thanks to improvements in die yields and process technology. After a period of asking, 'What do we do with this one?' system designers and software engineers always find new and unforeseen users at the high end for the latest generation, and when the price comes down, they engineer it onto the desktop.

When the 32-bit 386 DX was first introduced in 1985, it was initially used in high-end applications. With time, its price fell, and today, the 386 DX is the mid-range 32-bit CPU for office automation. The 386 SX appeared and claimed the low-end 32-bit desktop niche.

The 486 is moving down the curve, just as the 386 DX did. Not only does it possess raw performance, the 486 has a favourable price/performance ratio when compared with other systems, including some mainframes. For example, a 25MHz 486 runs at 20 MIPS, or 35,000 UNIX Dhrystones, while the IBM 3090/200 is rated at 18 MIPS and 31,000 UNIX Dhrystones. A 486 system ranges in price from US$5000 to US$15,000, compared to the cost of corporate mainframes which run in the millions of dollars – see the performance benchmarks in Table 1. The 486 also provides a price/performance improvement over 386 systems. A 486 system is comparable in price to a desktop system equipped with a 386 DX, a cache and a math coprocessor, but it runs twice as fast.

Currently, the 486 runs the most performance consuming applications

ally depend heavily on the I/O subsystem design.

Hardware performance considerations

THE INTEL 486 with its more than one million transistors, integrates an 8Kb cache memory, floating-point hardware and memory management on-chip, while retaining binary compatibility with previous members of the 386 processor family. The prefetch, instruction decode and control logic units have been designed to optimally integrate the on-chip cache into the instruction pipeline.

The 8Kb cache is organised as a four-way, set-associative, unified code and

the desktop

available. And the leading-edge members of the 386/486 CPU family will continue to do so. However, 486 systems will appear as mid-range desktop systems in larger numbers, especially as more 32-bit software appears that demands performance to serve its users with 'intelligence'.

According to Dataquest research, about 40 per cent of all 486 CPU systems are being used as powerful desktop PCs, and the rest as network servers.

These 486 systems have been called 'managerial desktop' or 'power office systems' because they are ideal for the managers and other power users. Financial analysts, for example, run econometric software and other data-intensive programs, in addition to typical PC applications such as spreadsheets and electronic mail.

The designer's desktop is another residence of the 486. Users of AutoCAD and other computer-aided design programs – architects, product designers and the like – rely on the 486's power to perform floating-point calculations to recalculate and display complex designs and numerical models quickly. Here, speed has an obvious advantage; the faster a designer can see a new version of a design, the less likely he or she will lose a creative train of thought. Of course, 486 systems also function as file servers, which need the processor's powerful integer unit to transfer large data files efficiently, and as application servers in local area networks and multi-user systems.

data cache. A cache line consists of 16-byte contiguous blocks of memory. The 486 is able to transfer code or data from its internal cache to the code prefetch buffers or execution unit in a single clock cycle (that is, a code prefetch that is a cache hit transfers 16 bytes of code from the cache to one of the 16-byte prefetch buffers in a single clock cycle). As a result, many instructions require only one clock cycle to complete execution when a cache hit occurs. This, along with enhancements to the processor's execution unit, has reduced the average number of clock cycles taken per instruction (CPI) execution from approximately 4.5 on the 386 DX to 1.8 on the 486.

Although the cache hit rate varies depending on the application, it tends to be well above 90 per cent. Even with the high hit rate, cache misses do occur. These misses, along with cycles that cannot be cached (that is, I/O, and so on), emphasise the importance of the hardware design interfaced to the 486 microprocessor.

To obtain the maximum performance from a 486 CPU-based system design, it is important to understand the trade-offs associated with the hardware design. Trade-offs exist in selecting a memory design, bus architecture and various systems peripherals.

Memory designs

THE MEMORY SYSTEM design is a major determinant of system performance. While the 8Kb cache on the 486 satisfies many of the processor's data requests, the requirements of multitasking and multi-processing software sometimes violate the principles of locality associated with a cache of this size. To maintain the high levels of performance, it is important to

have an efficient memory design. This can be achieved by optimising the main memory (DRAM) design or by adding a second-level cache.

Most systems' main memory design consists of DRAM. DRAMs are used because of their high density and low cost. However, DRAM access times lag the requirements of high-frequency microprocessors. As a result, the processor is forced to wait while DRAMs complete accesses to memory. To minimise the number of wait-states (the number of idle clock cycles the CPU waits for the DRAM access to complete), 486 DRAM designs can be optimised using the following techniques: bursting, memory interleaving, memory paging and write-posting.

The 486 uses bursting to accelerate multiple cycle data transfers such as cache line fills. Bursting takes advantage of the fact that the address for subsequent transfers is known as soon as the first address is issued. Although the first transfer requires the full memory access time, subsequent transfers can begin early and overlap with the previous access. The big-

Figure 2. Additional performance is achieved with a write buffer when a second-level cache exists. The memory controller must guarantee that a read is not performed to the address of the posted write until the write is completed. The simplest implementation is to delay all DRAM read cycles until the posted writes complete. This method still leads to a significant performance increase because it only delays cache miss read cycles while allowing cache hit cycles to continue without the delay imposed by non-posted writes. Note the improvement in all memory implementations by adding one level of write posting.

gest performance advantage that bursting provides is during cache line fills. If the memory system is fast enough, bursting performs a cache line fill in five clock cycles – two clock cycles for the first transfer, and one clock cycle for each of the three subsequent transfers. Systems that do not implement the bursting feature of the 486 require a minimum of eight clock cycles for the same transfer. All systems benchmarked use the bursting capability of the 486.

Memory interleaving is a technique that improves DRAM memory design and eases the implementation of bursting. Although there are several ways to implement memory interleaving, a simple method of using it to implement bursting is to design two 32-bit-wide DRAM banks. Data alternates between the two banks. Even DWORDs (A2=0) are in one bank and odd DWORDs (A2=1) are in the other bank. The bursting order alternates access between the two banks. Adjacent cycles can overlap access time to effectively allow single-clock cycle DWORD accesses. Multiplexors are used to alternate data and addresses between the two DRAM banks, and to avoid bus contention.

Memory paging is another technique used to improve DRAM memory performance. Memory is divided into pages (typically two kilobytes). Consecutive memory access to the same page is performed

more quickly. DRAM access normally requires a row address followed by a column address. Paged-mode DRAMs remember the row address from the initial access. As long as accesses are made to the same page only a column address is required, thus reducing the time required for the memory access.

Write-posting allows designers to optimise memory designs for the high percentage of writes seen in 486 systems. More than 70 per cent of all memory bus cycles are writes due to the presence of the 8Kb, on-chip cache. Through write-posting, the system signals the CPU that the write cycle has completed before memory has actually accepted the data. The CPU may begin executing the next instruction sooner, reducing the number of CPU wait-states in the write cycle. Varying levels of posting are possible. The 486 can post up to four write cycles to the external memory bus. A single write posting buffer for external memory can improve performance without adding much complexity to the memory design – see Figure 2.

Second-level cache

SECOND-LEVEL caches combine fast static RAM (SRAM) with cost effective, but slower, DRAM to reduce the overall memory access time. A second-level cache can hide (minimise the performance degradation) a relatively inefficient DRAM

memory design. Systems costs can be reduced by using a second-level cache in conjunction with a slower, but less expensive DRAM memory system.

A second-level cache will almost always provide a performance increase, but the amount of the increase is dependent upon the DRAM implementation. Fast DRAM designs will see less of a performance increase from a second-level cache.

In 486, the need for a second-level cache is usually application-dependent. For many applications, the 8Kb, on-chip cache is sufficient. If software or the hardware configuration require a second-level cache, there are several options to consider. In single-486 processor systems, the memory bus utilisation is usually between 50 and 70 per cent. Therefore, the benefit from using a second-level cache in single-CPU systems is a reduction in average memory access time, as opposed to a reduction in bus utilisation. The 486 Turbocache module is an optional second-level cache for systems based on a single 486 CPU. The 486 Turbocache module is a look-aside, write-through cache that is available in a 64Kb and 128Kb version. The look-aside feature allows the 486 Turbocache module to be optional, allowing users to determine the need for a cache based on the software they most frequently use. A look-aside cache monitors the CPU signals and intervenes for memory when a cache hit occurs. Write-through means that all writes to the cache immediately propagate to main memory.

In systems using multiple 486, bus utilisation may become an issue. A write-back cache can reduce bus utilisation in addition to reducing the average memory access time. With a write-back cache, writes are written in the cache. The cache only propagates writes to main memory when the cache location is to be emptied or replaced, or another processor is reading the location from main memory and needs the latest data. Write-back caches are more complicated to implement than write-through caches, because of the added requirements of cache/memory consistency. Unless bus utilisation is an issue, a write-through cache can reduce the average memory access time sufficiently and meet the needs of most systems.

System peripherals

SYSTEM PERFORMANCE is also dependent upon the speed of peripheral devices. The speed of standard bus architectures is fixed to maintain combustibility. However,

Effect of system implementation

THE PERFORMANCE of the 486 has been evaluated using the benchmarks discussed in the text. At the top are CPU-intensive benchmarks, while under that are the hardware configurations of systems A, B and C. All systems exploit the bursting capability of the 486 to a certain degree. In addition, systems A and B post one level of writes (see 'Memory designs' in the text). As the table shows, systems implementation has very little effect on benchmarks that are basically CPU-/memory-intensive. The benchmarks also reveal the effect of I/O subsystem design on performance when using I/O-intensive benchmarks, such as the US *PC Magazine* file access benchmark. This benchmark, for example, is highly dependent on disk subsystem implementation.

Systems A and B exhibit almost identical hardware implementations. There is, however, one factor that gives system A a slight edge in performance over system B. System A adopts a write-back, second-level cache policy, while system B implements a write-through policy. As a result, although the number of external code prefetches and data reads are substantially reduced, the number of writes to the bus remains the same – external bus write cycles constitute the majority of the bus activity. A memory system that is optimised for high-speed write cycles constitutes the majority of the bus activity. A memory system that is optimised for high-speed write cycles, such as the one in system A, would increase system performance by varying degrees depending on workload characteristics. For single-CPU systems in general,

Benchmarks	System A	System B	System C
CPU-/memory-intensive:			
Dhrystone v1.1 (Unix, KDhrys/s)	47.00	44.20	N/A
Stanford Integer Suite (VAX MIPS)	16.70	15.90	N/A
Whetstone (MWhet/s)	7.90	7.90	N/A
Linpack Single Precision (MFLOPS)	1.59	1.46	N/A
SPEC Integer	17.70	17.00	N/A
SPECmark	11.60	10.90	N/A
Excel v2.2 (OS/2) Recalculation	6.40	6.40	N/A
Dhrystone v2.0 (DOS, KDhrys/s)	35.00	34.50	N/A
CPU performance (I/O bound):			
File Access (OS/2, PC Magazine)	24.6	25.3	48.6
AutoCAD vl0 (OS/2, ACAD BM)	465	471	647
Hardware configuration:			
CPU/MHz	486/25	486/25	486/25
Main memory (Mb)	12	12	4
Cache memory (Kb)	128 (w/back)	128 (w/through)	None
Video subsystem	16-bit VGA	16-bit VGA	16-bit VGA
Hard disk controller	ESDI	ESDI	Embedded
Hard disk access time (ms)	18	19	21

however, the performance increase gained by using a write-back cache as opposed to a write-through cache is negligible. Furthermore, the time and cost involved in the design and development of a write-back cache is higher than for a write-through cache. So from a cost/performance point of view, a write-through, second-level cache policy is as favourable as a write-back policy for single-CPU systems.

Both systems A and B offer substantially better performance than system C for the *PC Magazine* DOS file access and AutoCAD system-level benchmarks. System C does not offer a sec-ond-level cache and does not post writes to memory. Furthermore, system C uses an embedded AT hard disk controller which introduces a bottleneck when running disk-intensive applications such as the AutoCAD benchmark.

It is evident from the above examples that performance depends on workload characteristics and system implementation. For example, if one were to look at the Excel spreadsheet recalculation benchmark, one would conclude that all three systems perform equally. The AutoCAD benchmark shows that performance can vary widely when the workload is I/O-intensive.

the newer standard buses (EISA and MCA) allow for wider data paths, and for a burst mode to transfer data at a higher rate. In addition, some peripherals can be optimised to increase system performance. For example, most programs require accessing a hard disk for data. If the interface to the hard disk is slow, the 486 must wait for data, thus reducing performance. Choosing a faster disk type such as SCSI will increase performance over slower disk types. In addition to the type of hard disk, a disk cache can be used to decrease data access delays.

The video interface is also a potential bottleneck, especially for graphics-intensive software. The faster the transfer of data to the video card, the better the overall system performance. Generally, the video interface is improved by widening the path for data to transfer. For example, a 16-bit video interface allows twice as much data to transfer in the same amount of time as an 8-bit interface allows.

Summary

THE SPEED OF microprocessors continues to increase in order to improve system performance. An increase in processor operating frequency is not sufficient to guar-antee the highest-performance system. Trade-offs in system design can help minimise the costs while allowing system performance to increase. The goal of system design is to minimise the amount of time the CPU is waiting for the rest of the system to respond. This is achieved by optimising the memory and peripheral interface design and the possible introduction of a second-level cache. Furthermore, throughout the design cycle, thought must be given to how to measure performance so that one may arrive at meaningful conclusions about the performance of a system. □

MAX PINNER

An introduction to WA

WESTERN AUSTRALIA has many talented programmers, computer analysts and consultants. Whether or not isolation stimulates self-help and a lateral approach to problems is debatable, but the fact remains that some innovative hardware and software is being produced in the state.

The purpose of this column will be to outline some of the personalities and products, initiatives and directions of the Western Australian computer industry.

Bold marketing

IN A BOLD move to capture a ready-made market of local and international software developers, Perth-based Atlas Software will allow all Clipper users throughout Australia to obtain free of charge a fully functional copy of its Australian Design Award winning 4GL Plastic Software and documentation for evaluation purposes.

The Link Switch is ideal for people who wish to access their computer at home or at the office.

Atlas managing director, Nic Rosato, said: 'If Plastic Software is as good as we think it is, it ought to be capable of selling itself. This is exactly what we are letting it do. Whilst it is common knowledge that many computer users use bootleg software, particularly for evaluation purposes, realists understand that this practice leads to more sales. Once users satisfy themselves that the products really do what they claim to do, they generally become legal by obtaining a proper license.'

'Plastic Version 5 is fully compatible with existing versions, and with the latest version of the popular Clipper compiler. 'Plastic slashes the time taken to construct a computer system. Its source code generator is capable of producing a 500

line, error free program within seconds, thereby replacing over 90 per cent of the traditional source code within applications,' Rosato said.

'It operates from a data dictionary which stores information on such topics as image and screen descriptions, the program's menus, and contents of the reports. An applications engine drives the menus, screens and reports, to develop new systems faster than source code systems can be cloned and modified.'

He cited one user who took nearly three days to write a program using his own tools, whereas Plastic took only two hours to write the same program. This was because unlike the users of other application development tools, the programmer working with Plastic does not need to remember the parts of a program whilst it is

How's this for an innovative idea? Nice Communications Pty Ltd in Perth has released a modem-controlled power point, the Link Switch that switches on a remote computer to allow two-way data transmission. Sales and marketing manager, John Park, said the Link Switch is ideal for people who wish to access their computer at home or at the office, without having to leave it switched on all the time.

'XT/AT software included with the spike protected Link Switch allows the computer to recognise that the modem is turning the computer on,' he said. 'This forces the computer to boot up, and as it runs the autoexec.bat it looks to see if the modem is on-line. If so, it runs either the file transfer software included with the Link Switch, or the user's own transfer software, ready to receive or send a file. When the modem goes off-line, the remote computer turns off and waits to be accessed again. Included is a simple security program, best used with a modem that has ring-back security.'

Mr Park said the $149 Nice Link Switch also includes a spike-protected RS232 adaptor that easily connects to any external modem. It incorporates a switch and LEDs to provide the computer with either remote power or manual power on.

being written. Plastic stores this information and presents the writer with options during the program's development. After the user has created a program with Plastic, the AutoDoc feature is turned on. The user performs the function to be documented, and Plastic will produce images of screens with real data, accompanied by English text to describe what happened during the session.

Plastic runs on all IBM compatibles with 640Kb of RAM, uses PC and MS-DOS, and is LANS supporting. It is also compatible with dBaseIII/IV as well as Clipper.

By acting on behalf of, and in the best interests of a client, we are also acting in the best interests of the company.

In addition to forming a Clipper user group, Atlas Software is preparing a training course in advanced system design and programming using Clipper and Plastic Software. Rosato said he expects a high demand for these courses, particularly from the business community.

Alken's code of ethics

SINCE BEGINNING trading last year, Perth-based Alken computers has developed a code of ethics to give proper advice and assistance to its customers, as part of an emphasis on customer service. Alken's Managing Director, Mr Ken Schultz, said that any breaches of the seven point code by his staff would be grounds for dismissal.

The code for all staff stipulates acceptable standards of honesty and care to avoid giving misleading information to customers about product suitability and specifications, delivery and payment times.

In the four points for Alken consultants, support and technical staff, Schultz ensures that clients' interests and confidentiality are protected. Full refunds are to be offered to clients who claim within 30 days that a product is not suitable for their purposes. 'We believe that in the long term, by acting on behalf of, and in the best interests of a client, we are also acting in the best interests of the company,' he said.

Schultz said the company has a philosophy of customer support based on four major operating principles – service, sales, consulting and rentals. He said that for many businesses experiencing difficulties in the current economic climate, renting a computer and peripherals is a viable alternative for those unable to afford the initial outlay.

'We deduct 50 per cent of the rentals paid from the purchase price should they eventually decide to buy the equipment. In a possibly unique service we also rent and install a complete business system, including software. This could range from a single PC running a stock or debtors' program, to a network running a full multi-user accounting system.'

Computer simulation into managerial positions

MANY ORGANISATIONS and businesses are likely to be the main beneficiaries of computer simulations and research into decision making and motivation processes, led by Professor Robert Wood of the University of WA's Department of Management.

Professor Wood, whose speciality is organisational behaviour and decision-making, has developed a computer simulation that tests the abilities of managers and students to make decisions in complex hypothetical situations. He said computer simulations, which are more dynamic than case studies, confront managers and students with problems not unlike those they meet in their day to day work situations. Managers receive feedback on the effects of their actions, they may be rewarded or sanctioned for outcomes, and they have the opportunity to learn and adapt their responses to the situation confronting them.

'Although simulations lack some aspects of every day reality, they can teach us a lot about managerial decision-making and creativity, strategies, and the effects of managerial incentives – goals and monetary rewards – on managerial decision-making effectiveness,' Wood said. 'The simulation I developed puts people in the role of a departmental manager for a small production unit. In this role, the managers have to make a series of decisions about how to allocate work and manage people in their department. The decisions needed in the simulation are the same types of decisions managers make in daily management of staff.'

Having a special interest in the way motivation programmes work within an organisation, Wood hypothesised that incentives can become an instrument by which managers overlook long term objectives in preference of short term goals. 'In looking at the effects of monetary incentives on decision performance, I found that when managers operate under a competitive reward structure they often become more anxious and less effective. However, in western societies, there is generally an increasing emphasis on reward structures, though this is occurring without clear research evidence.

'It is often very difficult in the short term to determine what is effective output by managers.' He believes it is one reason why organisations should establish management systems which develop indicators to reflect both quality and longer term performance. 'Within the private sector these can be measured by the quality of services or products, and by the effectiveness of marketing,' he said. 'The public service, on the other hand, measures its performance in terms of the efficiency and effectiveness with which it performs particular functions. In the latter instance, it is the public's perception which often becomes the determination of success.'

Incentives can become an instrument by which managers overlook long term objectives in preference of short term goals.

Professor Wood is aided in his research by Master of Business Administration students, many of whom are executives with several years of management experience behind them. He has been a consultant to the Senior Executive Service of the WA Public Service, an exercise that contributed to his belief that the Public Service performs well, given the complex environment within which it operates, and the extent to which it is open to both public and political scrutiny.

A graduate of Curtin University of Technology (then WAIT), and with a doctorate in psychology from the University of Washington, Wood joined the UWA earlier this year from the NSW University's Australian Graduate School of Management.□

GARY LUKE

The humble do_loop

YOU MIGHT NOTICE a new name at the top of this page. Due to work and other unnecessary time consuming commitments, Roy Hill has had to pass on the pleasure of writing this column. I'll now be the one who tears his hair out wondering what to write for the next month. Actually, I'll be tearing my hair out wondering what not to write. The reason Roy asked me to continue this column, which he initiated, is because I am constantly writing Forth code for fun and profit. You might have read of the piano roll system and the robotic games running in Forth, or tried the Mandelbrot program I contributed early this year.

We should all thank Roy for his contribution through this column. He has put a lot of time into support of Forth users by phone, letter and distribution of disks, as well as his part in organising the Forth conference a couple of years ago. There is a great shortage of information about Forth in Australia. *Your Computer* should also be complimented for publishing this regular Forth column.

> *The do_loop is one of the most basic building blocks of almost every computer language.*

Most of my work has involved control of external hardware in applications for users who might not be well versed in computers. These have included radio, control servo motors, stepper motors, MIDI musical instruments, pneumatic solenoid valves, and lighting equipment. Currently I'm working on two interactive educational games for the Australian Museum. One is in the form of a poker machine, with picture slides and questions on three reels, and responses to the player's answers on the screen. The hardware includes speed and direction control of an AC motor, solenoid operated brakes, and light sensitive touch switches. The other is a panel of almost 2000 LEDs in 250 circuits arranged in pictures of animals and linking chaser strings. The subject of the game is about energy from the sun being transferred as food through the network of predator and prey among animals. This game also uses a few solid state audio cards under computer control. Both games are running on antique IBM XTs.

This month we have two lots of code, one for beginners about do_loops and one for those who like to hook up extra electronics and gismos to their computers.

Loops for beginners

THE DO_LOOP is one of the most basic building blocks of almost every computer language. All it says is, 'Between two limits, with a step of a determined size, do something.' The steps can be up or down, fixed or calculated, or can even be dependent on some internal factor of the loop itself. Read through Listing 1. I have used the screen print words .R (dot-r) instead of . (dot) as it gives a string of numbers which is easier to read. You possibly have come across this word in the routines Roy wrote for temperature conversion.

```
\ EACH NUMBER BETWEEN THE LIMITS.
: loop1    20 0 do i 3 .r loop ;
\ COUNT DOWN.
: loop2    0 20 do i 3 .r -1 +loop ;
\ EVERY THIRD NUMBER.
: loop3    20 0 do i 3 .r 3 +loop ;
\ POWERS OF 2, or BIT SHIFT.
: loop4    256 1 do i . i +loop ;
\ BRANCH OUT OF A LOOP.
: loop5
        6 0 do  cr
         ." before  "
         key 27 = if i 4 .r leave then
         ." after"
        loop ." finished " ;
\ SEVEN NUMBERS STARTING WITH 23.
: loop6    23 7 bounds do  i . loop ;
\ CALCULATED CHART.
: loop7    10 0 do cr
             6 0 do i j + 4 .r loop
           loop ;
```

Listing 1. – a demonstration of do_loops.

Compare *loop1* and *loop2*. Depending on whether the steps are up or down, the limits are handled differently. For a loop with a positive step, the limits go onto the stack highest number first. For a loop with a negative step as in *loop2*, the lowest number goes first.

Loop3 and *loop4* use steps greater than unity – *loop3* uses a fixed step, while the step size in *loop4* changes for each repeat. If you have mistakenly put 0 instead of 1 for the lower limit of *loop4*, you will have successfully hung up the machine. Curse yourself and reboot the computer. Try changing the lower limit to 3 or 5. Type 2 *base ! loop4* <CR>. To watch the action in slow motion, type *DBG loop4* <CR>. The debugger executes a single component with each key press and displays the stack for your edification.

Loop5 demonstrates how to leave a loop before reaching the final limit. This loop will wait part-way through until a key is pressed. If the Escape key (ASCII 27) is pressed, it will immediately branch out of the loop. Note that the ASCII value of any key can be found by typing *key* . <CR> then press a key. Try it out with the cursor keys. In the March 1990 Forth column, Roy wrote about the *case* statement. The example he used makes use of the ASCII numbers for these keys.

Loop6 uses the word *bounds*, which takes two numbers off the stack and calculates the required limits for the do..loop. Instead of putting the upper and lower limits on the stack, you put the lower limit and the count.

Loop7 uses *I* which puts the index value of the loop currently being executed onto the stack, and *J* which returns the index value of the outer loop. For three nested loops, K returns the far outer index value. These loop index values, once on the stack, are normal numbers so they can be multiplied, added, or used by other words, as in the tone words in Listing 2.

Tone is a simple word to produce a sound from the computer. It works by toggling high then low bit zero of port $61 which is the control line to the speaker. The words *PC@* and *PC!* are explained in the hardware section later in this column. Don't worry if you don't understand how

it works, just type it in exactly as it appears here.

Uptone and *Dntone* both have a couple of error checking routines in them. They accept the limits for the loop in any order, either high first or low first, and arrange them correctly for loops which step up or down. The word *?enough* checks whether enough parameters are on the stack. After compiling the three tone producing words, try them out by typing in *300 10 uptone* <CR> and *60 20 dntone 10 MS 200 250 uptone 10 MS many* <CR>. When you have explored these words interactively for awhile, try replacing the print word in *loop7* with tones.

```
: tone      ( time #cycles --- )
    0 do
        $61 pc@ $02 or  $61 pc!  dup 0 do loop
        $61 pc@ $FD and $61 pc!     0 do loop
    loop ;
: uptone   ( limit1 limit2 --- )
        2 ?enough 2dup min -rot max
        do i 1 tone -1 +loop ;
: dntone   ( limit1 limit2 --- )
        2 ?enough 2dup max -rot min
        do i 1 tone loop ;
```

Listing 2. – once loop index values are on the stack they are normal numbers, so they can be manipulated or used by other words as in the tone words here.

Hardware control with Forth

ELECTRONICS TODAY published a project using a simple and cheap IBM interface card with an 8255A integrated circuit in June 1989. (For those that are interested in this project, *ETI* has been incorporated with *Electronics Australia*, and you should contact that magazine.) A similar but more versatile card, with two 8255As and an 8253 timer/counter, is available from Microgram Computers, (043) 34 1544; fax (043) 34 1334. These plug-in cards make interfacing very easy for both electronics and software development. Because of my own interest in hardware, this column will probably include regular references to these cards and other *ETI* projects.

If you are not sure of the electronics, ask a knowledgeable friend to join in with some projects. The 8255A ports are all compatible with TTL. The *ETI* article shows how to add relays and analogue integrated circuits. Don't forget to put 2.2K pull-down resistors on all outputs so that they don't turn on while booting the computer.

In the program listings, the numbers prefixed by '$' are in hexadecimal. They should be typed in as shown. Another confusing point might be counting from zero instead of one. The eight bits of an eight bit byte are 0 1 2 3 4 5 6 7. In hardware applications, hexadecimal numbers, and sometimes binary, make more sense than decimal. If you are not used to these number systems, please read one of the myriad of articles or computer books which explain them.

This program in Listing 3 is for a three-channel lamp chaser with switch control for on/off and fast/slow. It assumes that port A has lamps or LEDs attached to lines 0 1 and 2, and that port C has a switch which takes line 0 high for on or low for off, and a switch on line 1 for high equals fast or low equals slow.

```
anew 8255card
prefix decimal
$1B0 constant 8255port   \ for MicroGram's card
\ $279 constant 8255port  \ for ETI's card
8255port 0 + constant PortA
8255port 1 + constant PortB
8255port 2 + constant PortC
8255port 3 + constant cntlreg
2 base !
: 8255init   10001011 cntlreg pc! ; \ PA - out
                                     \ PB - in
decimal                              \ PC - in
: ?speed   ( --- f )
      portC pc@ $02 and 0<> ;
: gofast   150 ms ;
: goslow   500 ms ;
: wait    ?speed if gofast else goslow then ;
: ?go     ( --- f )
      portC pc@ $01 and 0<> ;
: sequence   $01 portA pc! wait
             $02 portA pc! wait
             $04 portA pc! wait ;
: chase   ( --- )
      begin
          ?go if sequence then
      key? until ;
```

Listing 3. – a three-channel lamp chaser with switch control for on/off and fast/slow.

The constant *'8255port'* should be set up for the particular card you are using. All other port address are related to this base address so can be used for either card. The binary number used in the word *8255init* is composed from the data sheet for the 8255A chip. This particular bit pattern sets up the 8255 for mode0 operation with ports A and B as outputs and port C as input.

The Forth word *PC!* is similar to the word *C!* except where *C!* writes an 8-bit byte to a memory address, *PC!* writes an 8-bit byte to a port address. The related words to read an 8 bit byte from a port is *PC@* and from memory is *C@*.

?Speed tests the state of the speed switch on line 1 by reading the port then masking out all bits except bit 1, and testing if it is non-zero. *Gofast* and *goslow* use

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In hardware applications, hexadecimal numbers, and sometimes binary, make more sense than decimal.

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the word *MS*, which is in the *timer.seq* file. *MS* executes a loop for a number of milliseconds. *Wait* puts these all together: it waits for a time determined by the speed switch. *?Go* is similar to *?speed* for testing the state of the on/off switch. *Sequence* outputs the three steps of the chase pattern with a delay between each step. If you wish to chase the lamp, which is off instead of the one on, then replace the three bytes which are output to port A with *$06 $05 $03* instead of *$01 $02 $04*. *Chase* loops until a key is pressed. Inside the loop, the state of the on/off switch is tested first by *?GO*. If it is high then execute *sequence*, otherwise branch directly to the key test.

For the really adventurous, hook up an analogue to digital converter chip, as shown in the *ETI* project, with a variable pot for the analogue device and redefine *wait* to : *wait PortB PC@ 2* MS ;* You will also have to redefine *8255init* to suit your own configuration of inputs and outputs.

Roy Hill has been copying and distributing disks of F-PC. I have had to make other arrangements. Manaccom, the software distributors who place regular ads in this journal, can supply sets of disks in two formats, 5.25-inch 360Kb or 3.5-inch 720Kb, for $15 including postage. For this bargain price they can not allow phone orders, credit cards or COD.

Next month I'll begin the Maze Mini-Series. Over a few months a maze monster will learn how to keep a log book of its travels and eventually find its own way to the exit. Please write in if you have any programming hints or problems, or any hardware applications you would like to run in Forth.   □

JOHN HEPWORTH

From Help! to Xdskcopy

LOOKING FOR A shareware DOS shell to do the job of Xtree, Norton Commander or something in between? Help could be the answer. Like both those well-known commercial products, it can show a visual tree of the directories on the hard disk, or can show a list of files in a directory.

The most important thing about Help is something in which it is small.

Help can manipulate the directory structure on your hard disk, and can run programs with .exe, .bat or .com extensions by pointing to them with the cursor or the mouse. It is also possible to give Help a list of file extensions and the name of a program that uses these extensions for its data files. Then pointing to one of these data files runs the host application and loads the file. Naturally, like all good DOS shell programs, Help has a host of ways to copy, move, rename or delete files, and can also change file attributes as required. It even comes with its own editor for ASCII files, while its file viewer can look at both ASCII and EBCDIC files.

The most important thing about Help is something in which it is small. When running one program from inside another, the free memory for the child program depends on the amount of memory used by the parent. When Help runs another program, it discards most of its own code and releases nearly all the memory. When the child program terminates, the discarded parts of Help are reloaded. The amount of memory used by the Help kernel while the child program is running? About 3Kb, which is far less than most other shells and probably as little as practicable.

When starting Help, a well laid-out main screen appears. At the left is a three-column window with file names in the default directory. Rather nicely, the next-level-up directory is not shown as just two dots, as it is in a DOS *dir* listing or in most shells, but as the words Move Up One. This file window can be zoomed to take up the full width of the screen, eliminating a statistics window at the right. It can also be changed to give time, date and file size details for each file.

The statistics window at the right of the default screen shows the total size of the disk, free space on it, and the space used by the files in the current directory. Other information includes the amount of memory, and the free memory available, plus date, time and the status of the various 'lock' keys.

Commands

AT THE BOTTOM of the screen are the names of the various actions that are possible. Each has one letter in capitals, and pressing this key activates the command. Attributes changes the file's ReadOnly, System, Hidden or Archive attributes. Naturally, it is possible to change these for one file at a time, or for a batch of several files. Copy does exactly that for one or more files; Drive selects the drive whose files and directories are to be displayed; Erase will delete one or more files; Files re-reads the current directory.

More commands at the bottom of the screen include: Print, which will output a file to the printer, screen or to another file, and a sub-option will display files in debug format with the hex values for each character at the right and ASCII or EBCDIC at the right; Quit returns to DOS; Run runs the program under the cursor; Sort selects the sort order for the directory, from Name, Extension, Date, Size, Time or Unsorted; Tree displays a visual tree of the directory structure; Utilities has many sub-options, including some to format disks, another to show the equipment configuration including the processor and the available serial or parallel ports; View shows the contents of a file, in many ways a 'read only' word processor; Words invokes the Help editor and loads into it the file under the cursor.

The final command is Help, which brings up a help menu with 13 items, each of which has several screens of useful ad-vice on the topic concerned. Context-sensitive help is available at any time by pressing F1; Locate looks through the current drive for files whose name matches a mask, naturally being able to use wildcard characters like * and ?; Move moves files from one directory to another without copying; Name renames one or more files; Options sets up the colours, the width of the file window and if it is to display full details of files, the number of lines on display, from 25 for all monitors to 43 for EGA and 50 for VGA.

Help is another amazing shareware program. It is equal to most other programs in its category, and bettered by few. It is powerful, convenient and economical.

Xdskcopy

WHAT'S YOUR GREATEST frustration? What seems to be a total waste of time? In my case it is using the Diskcopy program that comes with DOS to copy 720Kb, 1.2- or 1.44Mb disks. Even on a machine with oodles of megabytes of extended or expanded memory and tons of free disk space, it can only use conventional memory, with that part of memory that is below 640Kb I'm sure all PC users are familiar with the scenario that results.

Put in the source disk and run Diskcopy.

Xdskcopy works fast, much faster than Diskcopy, particularly for multiple copies.

This reads as much as will fit in memory, prompts for the target disk, and writes out whatever is in memory. It then asks for the source disk to read some more and the target disk to write it again. Usually this is enough for a 720Kb disk, but for 1.2Mb and 1.44Mb disks usually a couple more disk swaps will be required. Finally, to verify that the disk has been copied correctly, use the Diskcomp program. Again, swap after swap until the process of com-

The default Help screen has a three-column file listing with a status display at the right.

Help can show full details for all files in the file list.

paring the disks has looked at all tracks and sectors.

So often I've wished that Microsoft had written Diskcopy to use hard disk or extended memory if available, and verify on the run, so that only one program would be needed to copy and verify a disk, and also remove the need for those never-ending disk swaps.

An Australian product called Xdskcopy emulates Diskcopy in copying track-by-track from one disk to another, but has some very real and important improvements. Most importantly, if the source disk is too big to fit into memory it is buffered on the hard disk so that the source and target disks only have to be in the drive once. Other features include op-

tional verification, ensuring that the target was written accurately, and the ability to write multiple target disks after one read of the source. In addition, the user can choose the disk for the buffer files. Finally Xdskcopy does a virus self-check every time it is run, so that if it has been infected it will refuse to run, minimising the risk of creating copies with a virus. All the common floppy disk formats are supported, from 1.44- to 360Kb, and unformatted target disks are formatted as part of the copying process.

What happens if you haven't enough free disk space for the buffer? Xdskcopy doesn't directly have the ability to buffer in extended memory, but you could create a RAM disk, and then tell Xdskcopy to use it for the buffer. Finally, if there isn't a hard disk or RAM disk big enough for the buffer files, Xdskcopy will revert to asking for repeated Diskcopy-like disk swaps.

Using Xdskcopy is simple. Typing Xdskcopy alone at the command prompt gives a help screen. To actually copy disks: type Xdskcopy followed by drive information for the source and target disks, and switches for the various options.

Xdskcopy works fast, much faster than Diskcopy, particularly for multiple copies. Its speed and convenience soon makes it completely indispensable.	□

Product Details

Product: Help
Distributor: Taylor Software Tools
1103 Mendoza Drive,
St Peters MO 63776
Price: Registration is $30 plus postage, including a printed manual and the latest version.

Help is another amazing shareware program. It is equal to most other programs in its category, and bettered by few. Look for it on your nearest BBS as Help441.

Product: Xdskcopy
Distributor: Grant Glastonbury
RSD 15,
Callington 5254 SA
Price: $25 for registration and a copy of the latest version;
$15 to register without an update.

Xdskcopy works fast. Its speed and convenience soon make it completely indispensable. Evaluation copies should be readily available on a bulletin board near you!

PETER PHILLIPS

Promises of things to come

THE RUMOURS abound about forthcoming products for the IIGS, including System 5.0.3. There's also supposedly three new Zip accelerator cards, with promises of speeds up to 8MHz. The Transwarp card by Applied Engineering can go to 7MHz, so another megahertz will boot things along even more. Seven Hills Software is about to launch two new products, called Independence and SuperConvert. Independence is a set of printer drivers that support the HP DeskJet series and the HP LaserJet. System 5.0.3 apparently includes a driver for the HP DeskJet Plus, so at last IIGS owners can enjoy the benefits of this amazing printer.

It's possible readers may not be familiar with the HP DeskJet, as an ImageWriter or AppleLaser usually dominates the printer part of an Apple setup. Hewlett-Packard have produced the DeskJet in three versions over the years, starting with the DeskJet, followed by the DeskJet Plus, with the recent release of the DeskJet 500. These printers have a 300dpi resolution, which is the same as a typical laser printer, and the output quality is difficult to discern from a laser printer. Prices vary, but faced with competition from Canon's BubbleJet printer, prices have fallen to around $1100 or less.

A DeskJet printer requires an ink cartridge, costing $35 or so, and one cartridge will usually do 500 A4 pages or more, depending on the nature of the printed material. I've used a DeskJet for several years, and I have to confess I'm in love with it. It's quiet, relatively fast, maintenance free, reliable and you can purchase font cartridges that rival anything a laser printer can produce. When driven by an Apple, I imagine the DeskJet will print in graphics mode, printing the IIGS fonts rather than using its own. I have been waiting for a DeskJet driver for the IIGS for years, and at last things are about to happen. Previously I have operated the DeskJet by fitting it with an FX-80 emulator cartridge and driving the printer via an Ice Cable. This works reasonably well, but it's fiddly and having the right printer driver will open up a whole new world of quality.

The program called SuperConvert is an enhanced version of Jason Harper's SHRConvert program and apparently will be able to convert virtually any type of graphic. A new version of Graphic Exchange by John Maclean, distributed by Roger Wagner Publishing, has also been released. This version (version 4.2) operates with GS/OS and uses the IIGS desktop interface with pull down menus. A big feature is its ability to convert between Super Hi-Res to and from a MacPaint screen.

The Quick Page option in PrintShop Companion lets you design flyers, banners or anything that needs text integrated with graphics. This graphic is supplied on the disk, but graphics from other paint programs can also be imported.

Platinum Paint has an incredible range of graphic took about five minutes to prepare,

And with the launching of the low cost Macintosh range, it's likely IIGS owners will want to be able to transfer graphics as well as text.

At the time of writing, Apple have not announced when system 5.0.3 will be released, but Beagle Bros are using a version of it in Platinum Paint. The news is that the printer drivers for the ImageWriter and the ImageWriter LQ have been completely rewritten, giving vastly improved colour printing. According to my sources, Jason Harper (SuperConvert) had a hand in writing the drivers.

Getting back to the present, I've received review copies of PrintShop Companion IIGS and Platinum Paint. They are both marvellous products, with features that take the graphics capability of the IIGS quite a few leaps forward.

PrintShop Companion

THE PROGRAM IS supplied on a single 3.5-inch disk, with a nicely produced manual that explains things quite clearly, if a little patronisingly. Like most IIGS programs, at least 768Kb of memory is required and it operates quite nicely with a single 3.5-inch drive. It has the same feel

I have been waiting for a DeskJet driver for the IIGS for years, and at last things are about to happen.

and look as PrintShop GS, with the familiar grey buttons, the go forward or go back buttons. But it does things PrintShop GS won't do. You can create envelopes, labels (disk labels in particular), calendars, signs, posters and produce all kinds of freeform flyers. Another useful feature is the *cataloger*, which can gather together PrintShop graphics, fonts, borders and panels then print out a hard copy showing each graphic with its name printed above. There are six graphics printed per line, and these can be separated according to the type of graphic (border, fonts and so on).

The envelope feature allows the user to create envelopes that suit greeting cards, and the design can include all kinds of borders and graphics along with the address and a return address. Simply print it

out, cut along the lines, fold and glue, and the envelope is ready for use. Disk labels (3.5- and 5.25-inch) and mailing labels (1- x 3.5-inch) can be produced very easily, again with graphics to enhance the presentation.

Making a calendar is incredibly easy, and daily, weekly; monthly or yearly calendars with borders and graphics can be produced for any date from 1753 to 9999. The Quick Page option is a remarkably versatile section that allows the user to create all kinds of signs. It is virtually a small scale desktop publisher, but within the PrintShop environment. Mix graphics and text to produce imaginative advertisements, notices and posters. The graphics can be from most IIGS paint programs, and there are a range of fonts and graphics supplied with the program. Or you can draw your own, of course.

The editor section has a number of options allowing various sized graphics to be edited and saved for use. It can work with single hi-res, double hi-res and SHR graphics, although sometimes the colour palette for imported SHR graphics gets left behind. You can also import IIGS fonts for editing. This section is very powerful, and it can also convert graphics from Print-Shop GS format to New PrintShop (Apple

features, so many it's almost awesome. This and the method is described as a tutorial.

The graphic editors of PrintShop Companion allow full panel graphics, letterhead graphics, borders, fonts and so on to be designed for use elsewhere in PrintShop. This shot shows a graphic imported from Paint816 combined with some text.

IIe) format. IIGS fonts can be similarly converted into PrintShop format. For extra large graphics, four levels of scaling are available, 1/2x, 1x, 2x and 4x.

In summary, PrintShop Companion is one of the 'must have' applications for a IIGS. My only complaint is that the DeskJet printer is not supported, despite the ex-

Using the Wash option in Platinum Paint allows scanned pictures to be colourised without losing the detail.

Text can be manipulated within Platinum Paint in ways that are almost mind boggling. This shot shows some of the effects, with a smeared graduated background colour.

tensive range otherwise supported. The review copy was supplied by Dataflow, who are the distributors of the program. The recommended retail price is $79.95.

Platinum Paint

A COPY OF this all new graphic program by Beagle Bros arrived just in time for inclusion in this month's column, and I'm still discovering just how incredibly powerful it is. As I mentioned before, it uses sections of System 5.0.3 and therefore needs to run with the system disk supplied. Attempts to use it with system

PrintShop Companion is one of the 'must have' applications for a IIGS.

5.0.2 give an error message, suggesting some of the tools in the old system are now incompatible. For me, this meant reverting to single drive operation, with all the attendant disk swaps, as my hard drive could not be used. This minor problem will probably be fixed when Apple release the new system.

The first thing you notice with Platinum Paint is the number of drawing tools and the apparent absence of a colour palette. The second thing is the large range of options in the pull down menus. This is a sophisticated paint program that requires you to actually read the manual if you want to get the most out of the program. The manual uses the tutorial approach, again with chatty comments like 'congratulations you have just succeeded in ...' The tutorials are supported by files prepared for the purpose. These are on the program disk and they provide an excellent way to learn the program.

To fully describe all the features of Platinum Paint would occupy volumes, so I'll summarise some of them. The program can operate in either 320 or 640 mode, and will automatically switch between modes to suit a graphic imported from another paint program including PrintShop and MacPaint. There can be up to four files opened at once, either stacked one behind the other or tiled. The colour palette of the selected graphic will affect the others, but once selected, a graphic will revert to its original palette. Some interesting effects can be obtained with this.

There are a range of effects, such as wash, smear, blend, shadow and so on. The wash option lets you colour a scanned

image, in which the grey scale is retained but behind the selected colour. The smear option can change a stark image into one with no clear outline and blurred to give some amazing effects. The shadow option works with another option, in which an object can be made into a brush. To do this, the object is first lassoed, then the option *brushify* is selected. The object is then the brush and copies of the object can be placed anywhere on the screen. They can be individually sized, rotated and given shadows.

For a graphic with a large single area of colour, a colour gradient can be applied, in which various hues of the selected colour are used. The sky needn't be a single blue, it can be a range of blues from dark to light, giving a more realistic effect. The colour gradient can be from top to bottom, left to right, dark to light or any combination. The colours of the gradient are produced with a palette selected from the palette being used with the graphic.

Platinum Paint is an amazing program. It's not only amazing for what it can do, it's so easy to do it.

Text entry is also supported with a wide range of fonts, all with the usual effects such as bold, italics, shadow and so on. Text can be stretched, rotated, right and left justified, centred, given a 2D perspective, slanted and generally manipulated in ways no other paint program for the IIGS can do. Printing in colour to an Image-Writer or black and white to a LaserWriter is supported.

In short, Platinum Paint is an amazing program. It's not only amazing for what it can do, it's so easy to do it. Although the program seems rather overwhelming to start with, it's intuitive and therefore easy to learn. There's lots more, but space is limited and I don't want to spoil all the fun you can have discovering new things about this program. The review copy was supplied by DataFlow and should be available through your local deader. The recommended retail price is $139.95. Another 'must have'. □

To make an object look less like a computer generated image, Platinum Paint allows it to be smeared. The object at the top of the screen was smeared into the object shown at the bottom.

STEWART FIST

An intelligent look at tutorials

ISN'T IT always the way! Just when you get really enthusiastic about something, the experts come out and say it's no good. The doom-sayers this time are Dr Detmar W. Straub and Professor James C. Wetherbe of the University of Minnesota, who surveyed expert opinion on the most significant software technologies of today (with the aim of predicting the software trends of tomorrow), and concluded that expert systems and artificial intelligence will not be 'organisationally important in the 1990s'.

'Several [experts] indicated past levels of high expectation for these technologies, but now feel that expert systems and AI, during the last 20 years, have not fulfilled their promise,' says the report. And to rub salt into the wound, one of their experts, the former editor of *MIS Quarterly*, William King, referred to expert systems in the report as 'the snake oil of the 80s'.

AI

IT JUST HAPPENS that I have spent a couple of enjoyable days working through Ashton Scholastic's AI: An Experience with Artificial Intelligence, which is a fairly hefty educational tome consisting of a large loose-leaf folder and a couple of Mac disks. When you've invested this amount of time in plowing through such a substantial tutorial, you don't like to be told that it is all ephemeral fairy-floss, due never to see out the decade. So I say, 'to hell with Dr Straub and Professor Wetherbe'; AI will probably outlive them both.

AI seems to me to be one of those techniques or technologies that suffers (like mangos) from being hyped to the point where experience can never match expectations; then an over-reaction sets in. Ever since Kubrick's HAL flew off into the cosmic abyss, the sole commander of the space-explorer in *2001: A Space Odyssey*, we've had this candid-camera expectation that some day, some where, some robot was going to come up to us and say, 'You're obsolete'. This obsession comes from watching too much television.

So these ten tutorials can only help to put the technology into perspective, and if you are involved in computer education of

any type, you owe it to your students to give them a start in understanding the reasoning behind AI developments. Along with the 'tutorials' (for want of a better name) there's also a reference guide here for students, and an excellent teacher's guide to help things along.

Enjoyable learning

EVER SINCE AI began, it has been intrinsically linked to game playing. Researchers have long viewed games as a testing ground for machine intelligence, and some of the earliest AI programs were chess and checker programs. This one is based on noughts-and-crosses.

To hell with Dr Straub and Professor Wetherbe; AI will probably outlive them both.

Given the advances that have been made in expert systems and AI (especially pattern recognition by neurocomputers) it is difficult to see what Straub and Wetherbe are on about. I can remember when teaching a computer to play even elementary chess was considered a task too difficult for even the most powerful of mainframes; now we can buy off-the-shelf chess-playing machines that can hold their own with some of the top club players, and there are top PC programs that routinely defeat the Masters; even the Grand Masters on occasions. So it is hard to see how AI 'has not fulfilled its promise' – no one expected it to be that easy, surely!

Anyway. Back to the programs and the tutorial.

There are ten Explorations which all use the same basic game board – which is a six-by-six (maximum) matrix on which you play a version of noughts-and-crosses – or tic-tac-toe as the Americans insist on calling it.

You take a turn placing your piece on

the board (a Mac symbol for the machine and a face for you), then the Mac takes its turn, and so on until the winning combination is achieved – at which stage the voice synthesiser loudly crows 'I win' (if it did), or sneers 'Beginner's luck' if you did.

Each game can have between one and four winning combinations. What they mean by this (and using the conventional noughts-and-crosses as an example) is that three horizontal 'noughts' in a row, is one winning combination; three vertically is another; three diagonally down to the left is the third; and three diagonally down to the right is the forth.

You will start with Exploration 1 which is a very simple game played against the computer; here the computer already knows the rule/s. The difference between this game and noughts-and-crosses, is that you don't yet know what combination wins. You have to play a number of games and put up with the Mac crowing 'I win', until finally you work out that a win is only possible when you have placed four of your markers in a certain pattern. (I won't tell you what pattern – you've got to work that out.)

This is the simplest of games because there is only one winning combination, and it takes you only a game or two to work out the rule. The teaching point here is for the students to examine the strategy that they use to work out what is the winning combination – the way in which humans make a series of assumptions, then reject them progressively, until finally you latch on to the correct one.

Creating games

THE SECOND AND third Explorations, allow you to create your own games (winning rules) and watch how the AI program learns in virtually the same way. It will start off making random moves, losing games (you tell it when it has lost) then gradually it will analyse the patterns and define its own assumptions – then begin to test and eliminate some of these assumptions until it begins to win. Is this learning? I'm not going to get into this argument!

I must say that these first three Explorations support the first fundamental of

good teaching: they enthuse the student, tickle the curiosity, and make him/her keen to find out more about how the system works.

It is quite intriguing to watch this program learning by its mistakes – and the designers have had the foresight to provide some anthropomorphic features like beeps, grunts and groans and cyclical flashing buttons which show when the program is grinding away trying to make sense out of the patterns. At least it gives you the impression that the Mac is having as much of a problem as you do in trying to work out a game-plan. Unfortunately, that impression doesn't last very long when the program starts beating you at games you have devised yourself.

One control that you have over the program, is to decide how many plays in advance it will compute before making a decision as to where to place its symbol. If you've set Foresight at zero, it just makes the best possible decision based on the configuration of the board at the present moment; if Foresight is set to one it will look another move ahead. But the permutations and combinations of possible moves increase exponentially, so if you set Foresight to look five moves ahead, it can take an hour or more on a Mac II to work out the best move.

The key to AI's usefulness in the future, it is generally believed, lies in pattern-matching and the ability to learn, and both of these features are being explored here in this program.

It is important to make the distinction between pattern matching and matrix matching. With conventional noughts-and-crosses where three-in-a-row wins, there are four patterns and eight possible winning combinations (three vertical lines, three horizontal, two diagonal). However, when you play this same game on a six-by-six matrix board the number of winning patterns remains the same, but the possible combinations rise into the thousands – so the program must learn to handle data by patterns, not by 'bit-mapped' matrices.

OCR

THE IMPORTANCE OF this approach can be seen in OCR (Optical Character Recognition) where we can design a program which takes a bit-mapped image of, say, an 'R' and matches this by comparing it with stored matrices of other 'R's of different sizes and different fonts. But what happens when it finds an italic 'R', or a handwritten 'R', or one from some strange new font that the program has never been taught to recognise.

If we want to be philosophical, to apply AI to OCR, we are looking to discover the 'essence of R-ness', which is what all humans seem to have stored in their brains in some way. We find it impossible to define our brain-rules (what constitutes 'R-ness') in computer terminology and this, at one level, appears to be what AI is attempting to do (or rather to simulate).

You've got to be careful here; this is not just a reverse of the PostScript-type font-outline process which defines text characters by lines, angles and radii, rather than the dots of the old bit-mapped fonts. PostScript provides a description instead of a bit-map – but a description (while perhaps closer to 'R-ness') isn't the essence. There is something much more fundamental here in the way we recognise characters.

Did you notice the other day, that the Japanese announced a neurocomputer which is able to recognise (from a video image) one face and match it with one of 4000 stored in its databank. When you consider that the video image will never be exactly the same size, or taken from exactly the same angle – and that hair can be long in one image and short in another – and the face can be smiling, or frowning or blinking, and so on, this is a marvellous achievement by any standards.

So that is where we are heading, but the games illustrate the other important aspect of AI also – that of self-learning. If AI is ever going to be truly effective then these programs must be able to adapt to changing circumstances, which implies 'learning' of some sort. We can't afford the programming time to type in features of 4000 Japanese faces for identification.

Exploration 5 takes the student into the stage of heuristic learning and shows them the difference between this 'by-experience' approach and the algorithmic style. Induction is at the root of our ability to adapt to varied environments; algorithms can be used to make a program appear to be intelligent, but it is the adaptive/heuristics which are much closer to 'true' human intelligence.

The other five Explorations, successively take students deeper into the mysteries of how the AI program works. The tenth shows them how the program handles goals, and explains the difference between goals and winning patterns. I found the tutorials to be systematic, thoroughly educational and enjoyable as well.

AI: An Experience with Artificial Intelligence is available for any machine from the Mac Plus up, with System 5.0 or higher software. RRP is $89.95 and there are lab packs and site licenses. The program is distributed by Ashton Scholastic (043) 28 3555 if you can't find it at your local Apple Dealer. □

The whole approach in AI: An Experience with Artificial Intelligence is that of game-playing, to the point where I think many 'educationalists' might shy-off the program thinking that it isn't offering 'real' instruction. But it is. Pain and boredom aren't prerequisites to learning, despite what you learned at school.

JOHN HEPWORTH

Entertainment Pack

MY PRODUCTIVITY IS shot. It seems that I can't go near my computer without getting tempted by one of the games from Microsoft's Entertainment Pack for Windows, just when I should be programming, looking at new products, or writing!

When Windows 2.x came out it had just one game, Reversi, more commonly known as the board game Othello. Windows 3.x added a simple game called Solitaire, a version of the familiar card game also known as Patience. I won't admit, except under torture, how much time I spent (wasted?) on these two games. The Entertainment Pack compounds the felony with no less than eight programs, of which seven are games and the eighth is an interesting screen saver.

The games include two more solitaire card games, Golf and Cruel. While I don't know why Golf has that name, Cruel is devious enough to justify its name. Other games include an oriental-style tile game called Taipei, said to be like Mah-jongg (before anyone writes in, that is the spelling that Microsoft uses in the Help screens for Taipei), a Windows version of Tetris, plus Pegged and TicTactics. Finally comes the strongly addictive Minesweeper.

Taipei displays a pile of tiles, each with a symbol on them. Pairs of tiles with matching patterns are removed from the pile, though a tile can only be removed if it is not locked in place by neighbouring tiles. The idea of the game is to remove all the tiles, and observation and tactics are vital for success.

Pegged is a jumping peg game. A 'board' is set up, with various patterns of holes in it, and 'pegs' in some of the holes. One peg is jumped over another and into a hole, whereupon the second peg is removed. The idea is to continue until only one peg is left, and that one in a particular place! Easy to make individual moves, far harder to actually get the right conclusion.

Tetris is familiar to many from its original DOS version. A playing area is set up about half as wide as the screen, and nearly the full height of the screen. Blocks of various shapes fall from the top of the playing area, and are moved sideways and/or rotated so that they mesh with a growing pile at the bottom of the playing area. If a continuous row is made from one side of the screen to the other, it is deleted, shrinking the height of the pile. It's a good test of observation, pattern matching and decision making under pressure, and good fun as well.

TicTactics is noughts-and-crosses with a difference, with the standard three-by-three game, plus two three-dimensional variants. These are three-by-three-by-three, and four-by-four-by-four. Options include skill levels of beginners, intermediate and expert. It's possible to have the user always play first, the computer always play first, or to have random selection of first player.

The Microsoft Entertainment Pack for Windows is a must.

Minesweeper is deceptively addictive. When launched, it displays a screen that has a grid that looks like a whole lot of 3-D buttons. Beginner level is eight high and eight wide, intermediate is 16 high and wide, while expert is 16 high and 30 wide. Hidden beneath some buttons are mines, of the explosive variety. The object of the game is to find all the mines. The first move is random selection of a button by clicking on it with the mouse. If it is a mine, the game is over, but as only about one in five buttons conceals a mine you will survive the first move more often than not. If you were lucky and did not step on a mine, the button is replaced by a number. This is how many mines there are in squares that are immediately adjacent to the one containing the number. Now by use of logic and patience, work your way across the board, clicking on buttons until all those without mines have been select-

ed, whereupon a little flag is displayed for each mine. It sounds easy, but it takes a combination of skill and luck. Minesweeper is amazing fun, and can be very addictive, especially when you can win at beginner and intermediate level, and are chasing your first win at expert level.

The Microsoft Entertainment Pack for Windows is a must. It's available from most dealers for around $60.

Windows echo

MANY READERS have a modem, or have access to one, and make use of Bulletin Boards to download public domain and shareware software, and for echomail. Here questions, answers and comments are posted under various topics, in local, national and international areas, and messages are passed from board to board around the world.

This brings up the subject of the international Windows echo. It is the echo with probably the highest traffic of any echo on any topic, with between one hundred and two hundred messages per day. The Windows echo is moderated by Tim Carter, an active programmer of Windows applications who works in the North-East of the USA. A very active participant is Sue Coleman, a Microsoft tech support person from Seattle who runs a BBS on Windows topics to relax from all those Windows questions during the day!

If you have a Windows query and other general users of the echo can't help, Tim, Sue and others like them offer some pretty high-powered backup. It's also interesting to find the joys and problems of other users, and to try out the various solutions. Recently I saw a question posted on a Perth BBS and replied to it. A couple of days later I saw a comment on my reply from Missouri!

We all learn better in the company of others, albeit company via modem, than in a vacuum, trying to reinvent the wheel. The Windows echo is a great way to share information about the dynamic world of PCs in general, and Windows in particular. If you use Windows, and have a modem, then look for the Windows echo next time you log onto a BBS. If your local BBS does not carry it, suggest getting it to the sysop.

No logo

FROM TIME TO time I hear complaints about the sign-on Microsoft logo that is displayed when Windows is run. It is on screen for many seconds, and some users seem to think that it delays the loading of Windows. There are several ways that display of the logo can be suppressed, including the complicated and dangerous method of patching the Windows program. The easiest way is to start Windows with a space after the WIN command that runs Windows, and a colon after the space (WIN :).

I started Windows with and without the logo. Not surprisingly, the time delay from typing WIN at the command line, to having the hour glass disappear and all the groups and icons displayed was virtually the same either way. After all, what Windows does is to flash the logo on the screen, and leave it there while, behind the scenes, it gets on with the job of sorting out memory and loading its code.

Minesweeper is deceptively addictive.

WIN.INI

LOOK INTO YOUR Windows directory, and you will find several files with the .INI extension. These are initialisation files. They contain data read by Windows and various programs as they load, and are used to record preferences and standard set-ups. WIN.INI is read by the main Windows program as it loads, and is updated in several ways. When exiting Windows, and selecting Save Changes is just one way. This records the locations of the various group windows, whether or not Program Manager is normal, an icon, or maximised plus much more. When quitting individual programs, many of them record the user's preferences in WIN.INI. Of course a multitude of user's preferences can be set in Control Panel, which records them in WIN.INI.

It's also possible to manually edit WIN.INI with any ASCII text editor, such as Notepad.Exe that comes with Windows. Before manually editing WIN.INI it's important to make a copy of it to another disk or directory. Why bother? It's absolutely vital, when manually editing WIN.INI, that you can recover a good, working copy, should you make any changes that don't

work properly. Make a mistake, and Windows may refuse to load, or have other problems. If this happens, just copy the original WIN.INI from the temporary directory back to your Windows directory and all should be well.

Why not rely on the editor making a .BAK file? Two reasons. Not all editors make .BAK files. One save, and the original is gone. If your editor does make .BAK files, save twice and neither the main copy nor the .BAK will be the same as the original.

What change did I want to make to WIN.INI? In my various groups, the icons were just a little too close together. I wanted to spread them out. Looking into WIN.INI I found a line that read –

IconSpacing=75

I decided to edit WIN.INI manually. First I copied WIN.INI to another directory, then launched Notepad and loaded the copy of WIN.INI in the Windows directory. By changing the 75 to 85, and saving to disk, the next time I loaded Windows I got the visual effect I needed.

As edits go, this is very basic and unambitious. Future columns will look at many other little changes that can be made to the WIN.INI file to tune Windows to your preferences and hardware. I mention it here so you can get used to the idea of manually editing WIN.INI, and taking basic, but vital, backup precautions. Just remember, always make a backup of WIN.INI to another directory before manually editing it, and you can always recover from possible disaster.   □

It is possible to win at Minesweeper (expert level) but it takes logic and luck!

Taipei is a Windows version of the oriental tile game.

JOHN BAILEY

Computent packages

ALL SORTS OF exciting things have been happening during the silly season. A whole raft of software arrived from Roger Petheram of Computent in Dubbo. Included amongst it are programs for the liquor trade, small business, Clipper/dBase generation and two animal breeding programs.

From Programs Plus of Morphett Vale in South Australia comes an innovation in software marketing; a catalogue on disk. The catalogue is read by using the data search program supplied. To find a program in the catalogue it is only necessary to type the first couple of letters of its name and the price, publisher and a brief description appears on screen. In a follow-up 'phone call, Programs Plus asked if the software listing would be useful on a bulletin board. I don't really know, I have a deep (probably irrational) hatred of modems and consider 'walk-net' and 'post-net' the most efficient data transfer systems available to country folk. If you have not received a copy of this catalogue I suggest you give them a call on (08) 326 1313, fax (08) 326 8348, or write to PO Box 80, Morphett Vale 5162 SA. I know this sounds like a blatant plug, but it's the first time a software supplier has sent me anything like this and the method is so obvious.

My old friend Jerry Medlin of Napa California has sent the latest copy of his PC-Accounting software, it now includes a calculator on screen for those silly sums that we need to work in the midst of our book-work, and an invoice writing module is incorporated in the Accounts Receivable package.

Small business packages

BACK TO THE main topic of the day, Computent's Small Business packages. These are: SurePlan, Stock Control and BarStock. SurePlan is a menu driven general ledger, reporting and budgeting program; Turbo-access Stock Control, a stock-management system with a capacity of 32,000 units per type, 32,000 types, and the ability to group these types into 99 classes; and Bar Stock is an inventory package for the liquor industry. The Computent packages and Jerry Medlin's PC-Accounting share-ware are all priced below $200 with the exception of the Stock Control software from Computent which costs $349.

There are many tales of gloom in the bush these days and machinery dealers have some of the gloomiest. There are dealer-ships closing down and so on, but I am sure that the doors will open again. When these doors open what sort of businesses will they be? If they are simply doing more of the same, then I imagine that the competition might force them out. One of the biggest traps for dealers at the moment is the cost of inventory. One of the easiest things to computerise and hence analyse, is inventory. The whole thing is easily handled by standard data-processing techniques and the software is inexpensive, as you can see from the above prices.

Expanding horizons

IF YOU WERE one of the businesses that bought a large system and had staff trained to operate it; if those staff have collected their redundancy pay and you are left with two mechanics and yourself;

if the mechanics are only working a three and a half day week and you know it is pointless going out on the road because no-one is buying; I suggest that you get the manuals out of the box and learn to operate that computer system for yourself. Then teach your mechanics to operate the system. You would not still have these people employed if they weren't good staff, so do everyone a favour and expand your horizons. When they turn the light back on (the light at the end of the tunnel has been turned off to save power) you and your staff will be ready to train more staff, expand your inventory intelligently, and take advantage of improved conditions of trade at very competitive rates. If you are congratulating yourself on having avoided spending tens of thousands of dollars on a computer installation before the crunch, then I am going to suggest that right now is the time to buy a computer and something like the inventory and bookkeeping software mentioned above. The cost will be around two thousand dollars, perhaps a little more with EGA or VGA colour.

Acquiring skills

I KNOW THAT somebody knowledgeable and nameless suggested (in December 'Write Bytes') that the purchases of XT computers might be counter-productive bearing in mind long term requirements and so on. Yes, there is some logic in the statement, but we are looking at equipping small rural businesses with skills rather than hardware.

Survival is a fine thing and recent discussions with our business partner (which bank?) indicate that all expenditure is suspect and particularly expenditure on items that depreciate like computers. A new system will lose about a third of its value in the first week and a third of $2000 is a lot less than a third of the price of a '386 based system that will cope with the needs of a flourishing machinery dealer in 1993 or '4. First we have to last that long, next we have to be up to speed, in terms of our ability to use the system, if we do last that long. The cost of the simple XT system using Computent's packages will supply all the nuts and bolts of operating a high speed system. When the time comes to buy the faster system, the purchasing decisions will be made on the basis of a sound knowledge of your needs and the ability of various software packages to meet your requirements. If the cheap hardware was written off after three years, it would be a small training cost, remember that nobody can repossess your education, but you can always sell it and the more you use it to make money the more money it makes.

I venture to suggest that the Computent packages would satisfy the requirements of many small businesses into their '386 or '486 purchase in 3 years time. The manuals are well presented although the thermal binding on one of the review manuals has let go, this isn't catastrophic, Roger will send you another if it happens to you. I think of inventory and stocktaking as a minefield to be negotiated with extreme care and agility to avoid pain. The Turbo-Access Stock Control Program explains stock-taking and supplies the tools to administer a large inventory without much trouble. I would like to see some sample entries, either as printed samples of code descriptions or as files, included in the package so that new users could have a reference point from which to start.

BarStock

THE BARSTOCK PROGRAM particularly appealed to me because I become involved with stocktaking at the Country Club every now and then and it is not as simple as it might be if we used BarStock. The package is designed directly for the liquor trade and is configured to cope with such things as breakages, empties returned, breakage of empties and so forth. The liquor trade is not the only sector that involves reusable and fragile packaging and BarStock is flexible enough to be used in other ways.

SurePlan

SUREPLAN IS written in Basic and has to be run under BasicA which is no great problem, the snob within me says that modern software should be compiled, but the fact is that the software works and works well, today's climate calls for results. SurePlan is designed to provide management reports from its general ledger system and part of the reporting system relates actual performance to budget expectations. Computent have re-written a number of their packages in the last year, and I guess that if support warrants it SurePlan will be stream-lined. Perhaps the only thing I would like to see

I think that computers will help you if you use this slack period to take the technology by the throat.

Computent do with their software is to standardise the menus and keystroke parameters so that each package looks and feels the same. This approach ensures that when changing from, say, Stock Control to SurePlan the operator doesn't have to perform different keystrokes to change menus or enter data and the thing still feels the same. It is a good way to promote companion software; there is no learning time involved in the mechanics of the thing just some changes in function. I believe Jerry Medlin's PC-Accounting illustrates this point very well, every facet of the software uses a standard keying protocol, and having learnt one module the others seem like old friends.

The Computent packages cost: $149 for SurePlan, $349 for Stock Control and $149 for Bar Stock. The address is PO Box 789, Dubbo 2830 NSW, or phone (068) 84 3381 PC-Accounting is shareware from Jerry Medlin, 141 Sproul Avenue, NAPA California, 94559, or fax 0011 1 707 255 9266. If you plan to stay in business, make sure that you have equipped your brain to make the most of the good times when they come and meet the hard times now. I think that computers will help you if you use this slack period to take the technology by the throat. □

FREE READERS' CLASSIFIEDS

PC assistance
Are you having troubles understanding your IBM PC? Or do you feel that your computer is winning the battle? Why don't you become friends with it by calling a mediator. Me! I know most major software programs and can talk fluent comperteze. Relax in the comfort of your own home and start learning. Call Ray (02) 962 9292 any time.

Online Bible
10 disk set, both old and new testament. Will scan, search, save, print, any text, word or phrase in the entire bible. Excellent study aid! Also available Church Membership System database for members present and past, tithes, mail list, and much more. Bible 5.25-inch — $39.00 or 3.5-inch — $49.00. Church System for $19.00 or $24.00. David Sutherland, 45 Elstone Avenue, Airport West Vic 3042.

Re-ink your ribbons
Save and help preserve environment! Send $8 for first ribbon, $15 for two, $20 for three, plus $3.50 p&h to PO Box 191, Thornleigh 2120 NSW, (02) 875 2028. Ribbons are returned next day with satisfaction guaranteed!

Hot-foil pressed personal cards
Hot-foil pressed personal cards from $10/50. Computer printer ribbons re-inked or reloaded including mylar and multi-col. Send stamp for price advice on make/model of printer. Windsor Software, Box 408, Lutwyche 4030 Qld. Cut this out to keep.

IBM JX and Junior software
Shareware and public domain software for IMB JX (and Junior) computers. Suits 128K, 256K RAM and so on. Programs only $10 each. For a free catalogue write to Microtech Software, PO Box 145, Lilydale 3140 Vic, (03) 735 4821.

Lynx! Comlynx or swap games
Lynx! Comlynx or swap games in Dandenong area? Contact Graham Matthews, PO Box 200, Endeavour Hills 3802 Vic, or phone (03) 700 5219.

Computer for sale
Bondwell 14 portable, word processing, spreadsheet and so on. All manuals, printer cable, ideal computer for student. As new $300. Phone (02) 713 2030.

XT/AT Handbook
XT/AT Handbook by Choisser & Foster. Pocket size 92 pages. For engineers and programmers, and other serious PC/XT and PC/AT users. A collection of hardware and software facts and data on the PC compatible family and its operating system. Latest edition.

This is the one advertised by Annabooks in the US magazines *Byte, Dr. Dobb's Journal,* and so on. $20 including postage. 5 or more $15 each. Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043 Vic.

Weather Fax
Weather Fax programs for IBM XT/ATs. RADFAX2 is a high resolution, shortwave weather fax, morse & RTTY receiving program. Needs CGA, SSBHF radio and RADFAX decoder. Also RF2HERC, RF2EGA and RF2VGA, same as RADFAX but suitable for Hercules, EGA, & VGA cards respectively. $35. SATFAX is a NOAA, Meteor and GMS weather satellite picture receiving program. Displays in EGA & VGA modes and needs EGA or VGA colour system, plus Weather Fax PC card. $45. All programs are on 5.25-inch or 3.5-inch disks (state which) plus documentation, add $3 postage. *Only* from M Delahunty, 42 Villiers Street, New Farm 4005 Qld, (07) 358 2785. □

PCs for Blokes

The free Qantas trip didn't eventuate so watch for gratuitous references to Cathay Pacific then!!!
No advertising material and NO more "Three Tenors" CDs please.
(Re-told and illustrated by Foote and Mowth)

ALRIGHT LITTLE PC PALS. So it's back to work and to school is it? Did I enjoy my holidays? You'll be sorry you asked. "Never again" I say "never again will I let lend my jowls to the Christmas-seasoning!"

...... It all started back in December when the West Wobbalong PC and Cordless telephone users group asked me to do my bit and play the part of Santa. "We've got the outfit and you've got the physique Uncle Vern" they pleaded. When they told me that Santa got to mind the club's pubic-domain software disks over the Christmas break, I let them talk me into it. After all ..... what could I lose?

Scrub, Scrub, Scrub. The little lady gave the outfit a good wash in her great Grandma's special mixture of Mortein, vinegar, flat beer and DDT. She said that Geoff Hunter who usually plays Santa has fleas. She wouldn't say how she knew but the thought made me scratch for the rest of the day.

We had to touch-up the red in a few places where Geoff had spilled cheap whisky from his hip flask. Beetroot juice is about the right shade.

But when I went to try it on for the first time, we realised what was missing — old Hunter had used the beard to polish his car, and then his wife Margaret (the Demon Scone Lady) had thrown it out with the council clean-up. I rang around all the costume shops but it was too late, all beards had been rented. We couldn't find anything in the house that was big enough to cover my pulchritudinous personage and time was fast running out — the Santa ute was due to pick me up in just 20 minutes.

It's funny how genius hits in times of stress. There I was, all flustered and trying to stop the little woman from spray-painting my face white when suddenly I went all clear-headed and calm, and I knew just what to do — a brain-shower!

I'd just received my "Acne Cat Desexing Kit" I'd ordered from the American Express Platinum Card Christmas Catalogue. It had all the usual things — razor blade, Dettol, earplugs, gumboot ..... and it had a five ampoules of feline anaesthetic that might just save the day.

The next door neighbours were on holidays, and had left us in charge of their huge, fluffy white Persian cat. Got the picture yet? Within five minutes I had lured the cat in for a bowl of mouse-flavoured Whiskettes, administered the tranquillizer, tied the legs in pairs, tucked the tail out of the way, and strapped moggy around my face with a goodly application of gaffer tape. Just then the ute arrived and I rushed out before the little woman discovered what I had done.

Our last stop was the town hall, where the Mayor and his wife were waiting to greet all the Santas who had been out delivering presents to the kids. There was the Rotary club Santa, the Lion's Santa, the RSL Santa (that snake-in-the-grass Geoff Hunter who'd taken their job because it had a free bar afterwards, and he'd already copied all the software anyway), the Amway Santa and me. Each year the lady mayoress awarded her prize to the best Santa, and you got to get your picture in the Wobbalong Mercury.

I was starting to get uneasy, because the dope was wearing off and I could feel some movement around the denture region. Apart from anything else, no-one had aver told me how hot those damn Persians can get. And talk about ITCHY!!! Well, the inevitable happened. The lady mayoress called-out "and the winner for this year is .... the computer club Santa, Vern Shrunkle. I walked to the microphone, and leaned forward so she could put the ribbon around my neck. She must have startled the beard, because it did something distinctly antisocial which ran streaming off my chin and into her cleavage causing her to run into the council chamber' ladies room, screaming.

If it's feet hadn't been tied together I don't think we'd ever have caught that Persian beard. As it was, it managed to run three blocks on its tiptoes, howling all the way. And then to everyone's amazement it climbed the flagpole outside the fire station. They had to burn the flag later!

So that was how my Christmas started ... how about your's PC Pals?

Greg and Sean were up front in the ute, and Brad Williams was in the back holding me in and giving me the presents when we got to the kid's houses. Brad had to hold me in because there was a harness strapped to the cabin so Santa could sit on the back and wave to everyone as we drove past. The only trouble was, it was built for Greg's cousin's three ton truck, and it was so long I fell out twice and dangled six inches above the road. I nearly lost my locally famous Ho Ho Ho's.

Meanwhile, Sean was in the truck with his Mac portable wedged between his stomach and the dashboard. He was running a beta-test version of Claris MacPresent — with a database of all the kids who were getting presents. I think he had the index wrong though — it was supposed to take us across town street by street but I'll swear we went backwards and forwards starting with Aarons and ending with Zefferelli. The only good thing was, we had 9 hours of battery left when we'd finished.

WRITE BYTES
YOUR COMPUTER READERS' FORUM

Here's your chance to air your view or gripe about the computer industry, or to ask about a problem you've been unable to solve. And – we always like to hear about what we are doing right and wrong by our readers.
Write to: ***Write Bytes, Your Computer, PO Box 199, Alexandria 2015 NSW.***

Data security

I have a personnel placement agency and late last year I installed a desktop publishing system. The all-up cost was about $16,000. Everything is insured, but I'm more concerned about losing the work we've done. My interest in DTP arose because one of the senior consultants and I have been slowly putting together a guide for small business managers on selecting personnel. I haven't worried about 'data security' too much in the past (we do regular backups to tape), but now that the computer will be storing our 'creative' efforts, I'm wondering what additional steps I should take? I asked a consultant about it, but his suggestions were to spend almost as much as I did on the whole DTP system.

Jim Justin

It's not easy to put a value on your own creations, is it? Data security is more common-sense than anything else – like don't do back-ups religiously, then leave the tape lying next to the computer overnight: put it in your briefcase and take it off-site. Since the DTP system isn't critical to the real-time running of your business, I'd suggest a few simple actions to clear your worries. For a start, get a program such as the Norton Disk Doctor which identifies hard disk problems before they can do any damage; and, an anti-virus program if there is any danger of infection from foreign disks. Do your backups twice a day – most backup software allows them to be automatically run at selected times. Then, to assuage your worries, invest in a UPS (Uninterruptible Power Supply) that will give you enough time to save and shutdown. Two low-cost choices are the Emerson Accucard plug-in card, which should be available through your local dealer, and the PC Might standalone UPS, available through Lumen, (03) 792 4203 or fax (03) 791 3719.

Where are . . .?

At a gathering of PC old-timers, the conversation turned to 'whatever happened to . . . ?' and we thought you might be able to help with: Les Bell, Bill Bolton, David Hartley and Tom Cooper? A few years ago they were all well-known names in the industry, but seemed to have dropped from sight.

P. Scott

Les – YC's founding editor and PC guru – has moved on to the world of seminars and speciality publications aimed at the high end of the PC market; Bill – our own Mr CP/M and later, one of the most helpful and knowledgeable supporters of bulletin boards – is now, I believe, on the computer side of a large financial institution; David – of Hartley Computer fame – left Australia after an acrimonious debate with the government over support of the local industry four or five years ago and set up a factory making the BIZtel range of communications products in Hong Kong; Tom (and the rest of the Cooper brood) is busy setting up a distribution network for a new range of notebooks that you'll be hearing a lot more about shortly.

C++

I've been hearing a lot about object-oriented programming and the C++ language. I've been programming in C for a few years and wondered what advantages C++ offered?

M. Nicholson

Steve Goshnick gave your question a very comprehensive answer in 'The C++ Language – a cornerstone of computing in the 1990s' in our December issue. Steve has since released Octadial, a game written in C++ as a celebration of his conversion to that language. Back issues are available by sending $6 (no cash) to the address at the front of the magazine. □